Chemical Industries Week

March 24, 1951

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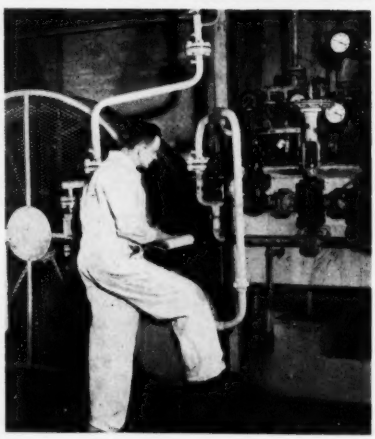

Navy purchasing officer answers industry's questions; selling to government is easy . . . . . p. 8

Atomic Debris, now disposal problem, will provide industry with low-cost radiation . . . . . p. 15

Liquid detergents: new brands, wider markets, herald battle for consumer's dollar . . . . . p. 19

CIW Camera goes behind steel and concrete barriers; sees acetylene react at 3,000 lbs. . . . . p. 27

Certificate-of-necessity rules clarified; estimated useful plant life determines write-off rate . . . . p. 29

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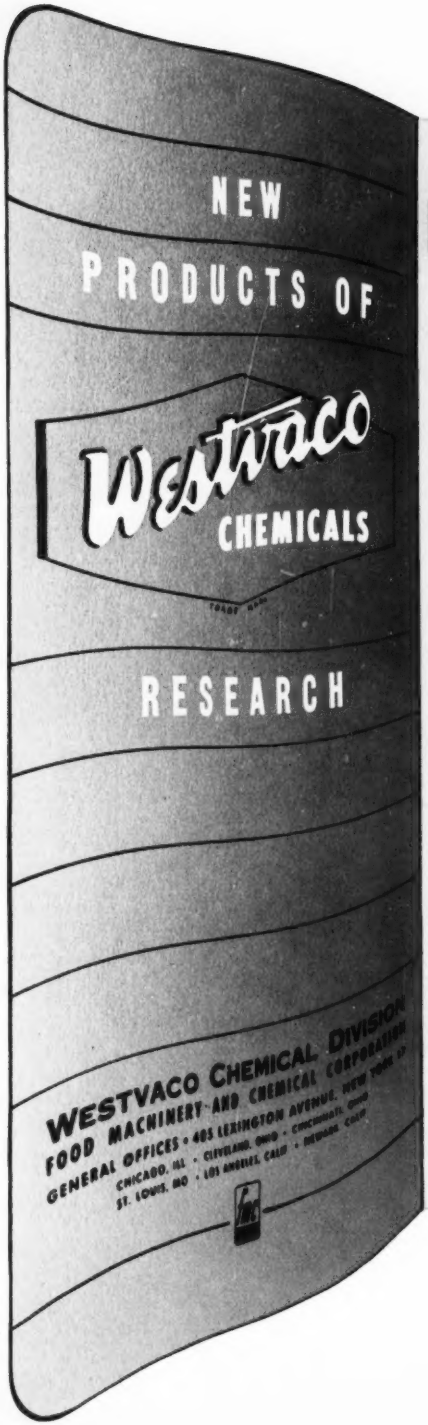
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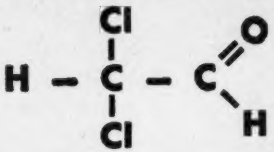

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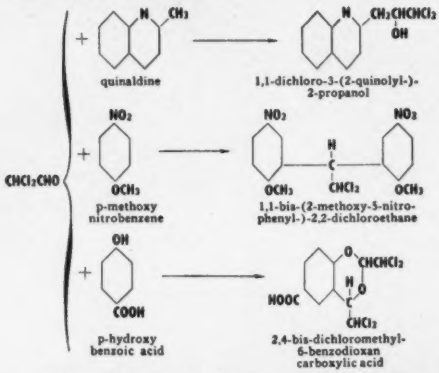

Properties: Colorless liquid which slowly and reversibly polymerizes to a white solid. Miscible in all proportions with water, alcohol, ether and carbon tetrachloride.

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Chemical Industries Week

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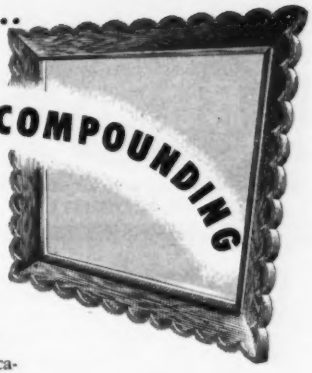

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OPINION . . . . .

Systemic Insecticides

To THE EDITOR: . . . . We would like 50 reprints of the article on systemic insecticides (Self-Defense for Plants) which appeared in your Feb. 24 issue.

We are licensed by the USDA to sell both Systox and OMPA for experimental use . . . the OMPA in aerosol form . . . .

PETER F. FINCK
Manager
Plant Products Corp.
Blue Point, N. Y.

CIW will be carrying more reports on systemics, intends to follow closely the development of OMPA aerosols for special (e.g. greenhouse) applications —ED.

Weekly vs. Monthly

To THE EDITOR: Your circulation department has been writing to me saying that they are curious as to why I have failed to renew my subscription to CI . . . . I'm glad to satisfy that curiosity . . . .

You'll be pleased to know that not only have I renewed my subscription but that it has never been interrupted.

Seriously, the only fault I can find with the new weekly is that it is a weekly. I have read CI monthly faithfully for some time but I am having a terrific job keeping up with the weekly editions and I do not want to miss a copy or skip over one . . .

H. J. LAWLER
Wilmington, Mass.

Glad to know that Reader Lawler is still getting CIW, hope he manages to keep up the weekly pace.—ED.

Wollastonite

To THE EDITOR: In connection with the Newsletter item in your March 3rd issue "Competition for carbon black makers is promised by a joint undertaking of Horizons, Inc., Pittsburgh Plate Glass Co. and J. M. Huber Corp. . . . The three firms will cooperate in promoting wollastonite . . ."

We have no "undertaking" or arrangement of any sort with either of the other two parties for the promotion of the material mentioned or any other.

R. H. EAGLES
J. M. Huber Corp.
New York, N. Y.

See below.—ED.

To THE EDITOR: This letter will refer to the news item which occurred in CHEMICAL INDUSTRIES WEEK Newsletter of March 3rd issue—"Competition for carbon black makers . . . ."

So that the record may be straight, Horizons has not entered into a cooperative agreement with either J. M. Huber Corp. or the Pittsburgh Plate Glass Company on this subject. Our interests are in patent interference on this development.

Our scientific interests lie in a pigment developed from the wollastonite mine owned by Mr. Koert Burnham at Willsboro, New York, and operated by the Willsboro Mining Company.

EDWIN T. GOODRIDGE
President
Horizons, Inc.
Princeton, N. J.

CIW apologizes for a clumsy misinterpretation of an interviewer's report. —ED.

Restyling, Frequency

To THE EDITOR: I have circulated CHEMICAL INDUSTRIES WEEK to many of my associates here and we all find it very interesting.

I think the restyling job you have done is excellent and its increased publishing frequency will be very helpful.

C. P. WALKER
General Sales Manager
Chas. Pfizer & Co., Inc.
Brooklyn, N. Y.

Take It Off

To THE EDITOR: Your article on silicones as the new "sell" in polishes in your March 10 issue called to mind an experience I had this winter which showed me that manufacturers do not always do a complete "selling" job in launching a new composition. Last summer I put a silicone polish on my car, and gave it another coat late in the fall. My wife . . . bashed in a fender . . . I had a little shop repair it, but shortly thereafter, the repaint job began to spall off.

Then I went to a larger shop where I learned that the cause of my poor repaint job was that the silicone polish had not been properly removed. This man outlined the procedure he followed before applying the prime coat: 1. Complete wash with his regular cleaner in hot water. 2. Dry. 3. Removal of polish with disposable rags. 4. Sanding. 5. Rinse with solvent and wipe.

Manufacturers selling silicone polishes have not done a complete merchandising job until they have made sure that everybody who should know about silicones is properly informed

as to their characteristics. In my case, the man who bought the can was told how to apply it. That wasn't enough to insure complete satisfaction (as my wife proved).

Incidentally, I am still using silicone polish for my car, but I wonder how many converts to the "new miracle ingredients" have been lost through experiences similar to mine.

J. HAYES LOW
Montreal

CIW thanks Reader Low for his sound exposition on surface preparation before painting. It is true that silicone polishes have to be properly removed as do conventional waxes. In the case of silicones, the important point is to use disposable rags with the solvent—gasoline is a common one—so as not to redeposit the silicone.

Manufacturers have not been as lax in spreading this important bit of information to refinishing establishments as Reader Low's experience indicates. His point about educating all levels of the trade in launching a new product, nonetheless, is sound advice.

CIW's March 10 piece was primarily about furniture polishes. Here the problem is not as acute. But if Reader Low's wife should bash in the coffee table, he need not fear, for silicones are no problem to a competent furniture refinisher.—ED.

Fertilizer Laws

TO THE EDITOR: In your Newsletter Department (March 3), it is stated that eleven laws for the control of production, etc., of fertilizers and their materials are being considered by various States.

I would appreciate very much to receive from you a list naming these States or any more of them which may have come to your attention since the publication of this information.

HOWARD D. SALINS
Managing Director
The Flax and Fibre Institute
of America
Chicago, Ill.

The States: Arkansas, Texas, Georgia, Minnesota, Idaho, Nebraska, California, Wisconsin. For a complete roundup see p. 36, Mar. 17 issue.—ED.

CIW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.
Address all correspondence to: The Editor, Chemical Industries Week, 330 W. 42nd St., New York City.

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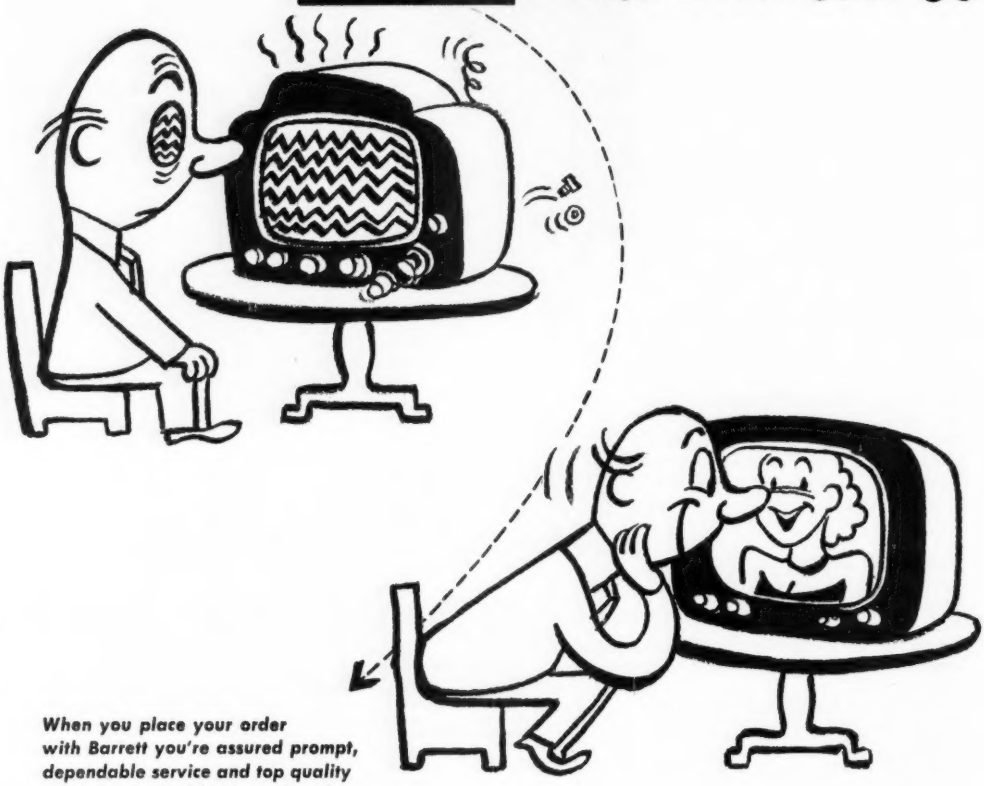

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Chemical Industries Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

Citric and tartaric acids will be manufactured in Canada by Kemball, Bishop (Canada) Ltd.—a new firm set up by Kemball, Bishop & Co., Ltd., London, England, and Chas. Pfizer & Co., Ltd. Located at Cornwall, Ont., the new plant is expected to start production late this summer. Production will take care of Canadian demand and leave some for export. Sales will be handled by Watt & Scott (Montreal) Ltd.

A new oil-soluble rust inhibitor, which protects metal parts ten to fifteen times longer than previous formulations, is being readied for commercial production by Alox Corp., Niagara Falls, N.Y. Samples are now being tested by several Government arsenals.

A high-melting (223-229 C), tough, dark synthetic wax is now in pilot-plant production. Its high flash and fire points, water repellency and insolubility in common solvents point to unique applications. Because the raw materials needed for its manufacture are in short supply, it will not be available except for military needs.

NPA is having a hard time trying to write an order on sulfuric acid. Reason: Lack of specific data on end-use of the chemical and the absence of a clear picture of supply-demand relationships. NPA will order allocation shortly, presumably as a schedule to the general chemical allocation order. The proposed order would require buyers to certify its use. But, in the eleven Far West States, because of the many consumers and low supply, specific NPA authorization would be required before delivery could be made.

Sulfur and sulfuric acid were the chief subjects discussed at the first meeting of USDA's Fertilizer Industry Advisory Committee. Fertilizer makers complained of a shortage of box-cars, and textile and paper bags. Main complaint was the sulfur shortage. NPA, OPS and USDA officials were on hand to discuss the jurisdiction in the fertilizer field of their respective agencies.

Curtailment of U.S. sulfur exports is having a far-reaching effect: Fertiliser & Chemicals Co. Ltd. is spending $1 million to convert its sulfuric acid plant at Haifa, Israel, from sulfur to pyrites. Israel was producing its own acid requirements until last month, when lack of elemental sulfur crimped output.

Plating wastes are proving to be a waste-disposal problem in Ohio. The state is now sponsoring a project at the state university to find out how much of the metallic solutions can be added to ordinary sewage without interfering with biological oxidation.

Phenolic wastes are another headache, and the eight-state Ohio River Valley Water Sanitation Commission is setting up a pilot plant to test disposal methods. The steel industry is cooperating in the study.

Bureau of Mines says that the Northwestern Colorado area oil-shale deposits, expected to yield 125 billion barrels of oil on the basis of using shale running 25 gallons a ton or more, will probably yield about 494 billion barrels if deposits of 15-gallon-a-ton shale is included. Only shale containing 25 gallons or more of oil a ton is now regarded as economically important, but technologic advances will make the lower grades usable in the future, Bureau engineers say.

Libbey-Owens-Ford Glass Co. will manufacture fiber glass at Parkersburg, W. Va. License arrangements have been made with Owens-Corning Fiberglas Corp., and L-O-F is setting up a new division to handle fiber products. Production will get under way in about six months.

The Office of International Trade (Commerce) has added DDT, benzene hexachloride, and sebacic acid to the "positive list" of exports. This means that a validated license is now required for shipments to all countries except Canada. The OIT regulation exempts shipments of DDT and hexachloride under $100, and of sebacic acid under $250.

The Natural Rubber Bureau will establish a laboratory in a Washington, D.C., suburb for experimenting with rubber roads. Test stretches of these roads already exist in several cities (CI, March 1950, p. 353). About 5% of the paving material is rubber powder. Longer life and less maintenance are the claimed advantages.

Naphthenic acid producers and the NPA got together on details of a proposed allocation system which will require buyers of the acid to certify to their suppliers the use to which the chemical would be put. Provisions covering the allocation will be issued shortly in the schedule accompanying the forthcoming general chemical allocation order.

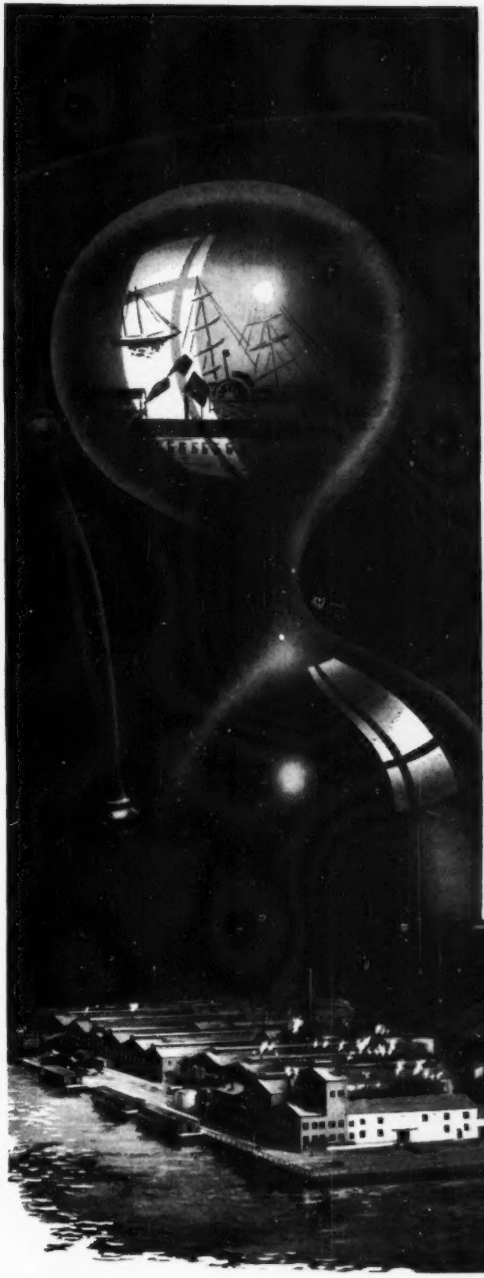
Emphasis on fireproofing leads to expanded output of suitable chemicals: Harshaw Chemical Co. is installing an antimony oxide plant at Gloucester City, N.J. Antimony oxide is used as a flame retardant.

Chlorine producers met last week to discuss a proposed $215 million expansion program for the chlorine industry. NPA officials say needs in 1953 will be about 3,640,000 tons. Capacity now is 2,150,000 tons a year, indicating an expansion need of 1,500,000 tons.

Du Pont is reportedly planning to rename its polyglycol terephthalate fiber again. Known first as Fibre V, it was renamed Amilar last month; new name will be Dacron.

UNRRA aids the enemy: While the United Nations Relief and Rehabilitation Administration was still functioning, some of its funds were used to buy all the equipment for a penicillin plant (50 billion Oxford units per month), which was sent to China. BOTRA (UNRRA's successor) and Nationalist red tape delayed construction, and the entire unassembled plant fell into Red Chinese hands. It is now being erected at Hankow.

. . . The Editors



Over a Century

of Progress in Chromium Chemical Production

"Baltimore" and "Bichromate" are names which have been associated with one another for over a century. The upper section of the hour glass shows Baltimore Harbor as it appeared in 1845 when it was the site of the first chromium chemical plant in this country. Shown in the lower picture, are Mutual's new facilities on Baltimore harbor.

The new plant is the largest chromium chemical plant in the world, and includes the most modern manufacturing techniques developed by industry's leading engineers. With these new facilities, Mutual has provided substantially increased capacity for ever-growing consumer needs.

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WHAT'S NEW . . . . . .

CONTRACTING OFFICER UNDERWOOD: Reading and understanding are basic.

How to Sell to Government

There's nothing complicated about selling chemicals to the military. CIW editors, like many a business man, hadn't been too sure, paid a visit to the Navy Purchasing Office, asked some questions and came away with that impression.

That's good news for chemical business men, for there's no doubt of the trend toward greater Government procurement. Contracting officers are eager to help, wish companies would consider doing business with the Government.

Although the Navy Purchasing Office on East Sixteenth Street in New York City is only one arm of the Defense Department's procurement organization, all such purchasing is carried out under the Armed Services Procurement Regulation, and the procedures are generally uniform no matter what office is doing the buying. And since companies seeking to bid on Government business tend to make the same kinds of mistakes, one office's advice about common pitfalls applies pretty much across the board.

Biggest failure among bidders—and this applies to large companies as well as the little fellows—is that they don't read and understand all of the specifications in a bid. It sounds elementary, but every time an invitation to bid is sent out, it should be read. Too often a company which has bid on a similar item in the past thinks it knows the score and doesn't bother to go over the new bid with the necessary care. Too late it may discover that a very basic change has been made in the specifications, and that its old calculations are no good.

Next to that, the biggest cause of headaches is reluctance to come into the purchasing office—or to write or call—and ask questions—*before* the submitting date. To wait until the bid has to be submitted, or to ask questions after it has been submitted doesn't make either the Government's or the business man's job any easier, can cost the latter money.

CIW found the Navy Purchasing Office willing to explain its functioning. Lt. (j.g.) W. H. Underwood, Jr., contracting officer in charge of all chemical procurement at that office, is tolerant of elementary questions, willing to make the mechanics of military procurement clear. Here are some of CIW's questions and his answers:

CIW. What does this office purchase?

Lt. U. Insecticides for all the services. Chemicals for the entire Navy.

CIW. Are bids let only here?

Lt. U. This is the only office for Navy chemicals; other offices buy small quantities, but this office buys for "national stock." This is the only purchasing office for national stock of military insecticides. The Aviation Supply Office, in Philadelphia, however, procures those chemical items peculiar to aviation.

CIW. How does a manufacturer know what the Navy wants so that he can submit a bid?

Lt. U. Normally the Navy lets people know through bid solicitation. It has a mailing list of people who can supply different categories or materials it buys, and sends them invitations to bid. Also the Department of Commerce publicizes most bids. Unclassified invitations to bid can be examined by persons with a legitimate interest in them, such as publishers, trade associations and procurement information services. We have these available here in our "bid room." If the material desired is of a popular nature, there may be some publicity on it in the newspapers.

CIW. How does a manufacturer get on this mailing list?

Lt. U. He can get himself on the list by submitting a questionnaire form listing the articles he can supply the Government. Chemicals, drugs, gases and soap are "Class 51" purchases. A chemical manufacturer or regular dealer who checks the class 51 materials he can supply will get bid invitations from this office.

CIW. Manufacturer or dealer?

Lt. U. That's right—either. The Government will buy from manufacturers or regular dealers in the supplies to be procured. The Armed Services Procurement Regulation defines the latter—in obtaining such supplies as chemicals—as a person running a store, warehouse, etc. where ". . . supplies . . . of the general character described by the specifications and required under the contract are bought, kept in stock, and sold to the public in the usual course of business"; or a bona fide manufacturer's agent.

CIW. Is there any penalty for a person not normally in the business getting on the list?

Lt. U. No. The Navy can't police all requests of that nature, but it does investigate before awarding a bid. That means that an unqualified person making a bid that entitles him to consideration is causing the Navy extra work.

CIW. Generally how much time does it take between the time the invitation is mailed and the date a bid must be in?

Lt. U. It is hard to generalize. Three to four weeks might be an average time.

CIW. Between opening and awarding a bid?

Lt. U. Say five days, but again it is very flexible. For example, if a bid is for over $300,000 and a low bidder is rejected for some reason or other, clearance from Washington must be obtained before the award can be made.

CIW. Is purchase by public bid the only way the Government now buys?

Lt. U. The Government buys both under public solicitation of bids and by negotiation, depending upon which is considered in its best interest.

CIW. Once a company has submitted a bid, can it withdraw?

Lt. U. It can withdraw or modify any time *prior* to opening. The contracting officer must be notified by mail or telegraph. After a bid has been opened, there can be no modification or withdrawal, but there are provisions for handling minor irregularities and mistakes in bids.

CIW. Does low bidder always get the award?

Lt. U. The "lowest responsive and responsible bidder" generally gets the award.

CIW. What is a "responsible bidder"?

Lt. U. He has to qualify as a manufacturer or regular dealer, as previously defined; he must be financially and otherwise qualified and eligible—i.e., he must not be on a Government department's list of ineligible contractors or be a disqualified bidder. To be "responsive," his bid must be in full accord with the requirements of the invitation.

CIW. Does a bidder have to have his sources of supply lined up ahead of time?

Lt. U. We expect every bidder to be able to meet his contractual obligations in the event of an award. Possible delays must be indicated in his bid.

CIW. Can he use DO's to help him get supplies? To what extent?

Lt. U. Yes. However, the DO rating does not guarantee availability of those supplies. Suppose, for instance, that a contractor needs chlorine. His source of supply may have other accounts with similar DO authorizations. Our successful bidder will just have to wait his turn.

CIW. What is the penalty if the bidder fails to deliver?

Lt. U. The penalty may be terminated for default, in which case the contractor would pay the difference in cost between his contract price and the price the Government has to pay to secure identical supplies elsewhere.

CIW. Can one who has defaulted on one contract, bid on another?

Lt. U. He may be placed on the ineligible bidders' list for all or for just one commodity; on the other hand, he may not be placed on the ineligible bidders' list at all. It depends upon the circumstances of the case.

CIW. When an award is made, the bid then becomes a contract. Isn't that so?

Lt. U. A successful bidder has a contract when a notice of award signed by the contracting officer on the prescribed form has been mailed to him.

CIW. What sort of Government inspection is made during manufacture and upon delivery?

Lt. U. This will vary. Sometimes there is inspection only on delivery—this applies generally to small items. In quantity purchases, samples normally will be taken at the source of manufacture and sent to the Navy Industrial Testing Lab. Generally the tests and inspection requirements are spelled out in the specs themselves.

CIW. What does an invitation to bid specify?

Lt. U. It is an "invitation and bid." It contains all the information necessary to guide a prospective bidder in arriving at a figure for the desired supplies. Besides such basic information as the office issuing the invitation, the date by which the bid must be submitted, the bid number, etc., it shows the quantity needed; the quantity to be delivered at different points within specific dates; the manufacturing and packaging specifications; special instructions and cautions; type and place of inspection, etc.

CIW. How long does it take before a company can get paid for its supplies? Isn't it a common complaint that the Government takes too long in paying?

Lt. U. This is a matter under the cognizance of the respective Navy Regional Accounts Office. Payment of invoices is the function of the various Navy Regional Accounts Offices. Generally payments are made without any undue delay. However, this office is always ready to offer whatever assistance may be necessary to expedite payment. Delays in payment are frequently due to improper submission of invoices, and failure to follow instructions in the contract.

CIW. Does the Government make loans available to help companies?

Lt. U. Yes, under certain conditions. There are regulations covering defense contract financing.

CIW. Will you allow time for a company to get needed equipment if something special is needed?

Lt. U. That will depend entirely upon the circumstances involved.

CIW. If a company defaults, what procedure does the Government take to obtain supplies elsewhere?

Lt. U. That depends on the case. The contracting officer can negotiate if it is necessary because of urgency; or he may readvertise, as the best interests of the government dictate.

CIW. Are specifications made available to the public?

Lt. U. Any party with a legitimate interest can obtain a copy.

CIW. Are awards always made public?

Lt. U. Yes. All competitive bids are made public at the opening. Moreover, bids are abstracted and available for review by interested parties.

CIW. What is a "class award"?

Lt. U. That is easily explained by an example. For instance, if there are several destinations specified for one item on a bid, and there is only a small difference in price on materials for those several destinations by different bidders, it may be cheaper for the Government to give the entire award to a single bidder, i.e., a class award, rather than to make multiple awards to different bidders, each of whom has submitted the low bid for a particular destination.

CIW. Any last bit of advice for chemical companies?

Lt. U. We've covered most of the pitfalls. There is one warning that small companies in particular should heed: Don't bite off more than you can chew.

ARMOUR *Chemical Division*

Fatty Acids
Long-Chain Fatty Acid Derivatives
Industrial Oils

Economical red oil replacement available in Neo-Fat tall oil fatty acids

With the raw material situation as it is today, manufacturers are looking for uniform quality replacement products. Fractionally distilled tall oil fatty acids have found broad usage as red oil replacements, but what is more important, they've been consistently lower in price.

Fractional distillation of Neo-Fat tall oil fatty acids guarantees light color, mild odor, low unsaponifiable content and uniformity. Large scale commercial production of Neo-Fat tall oil fatty acids assures availability.

Neo-Fat S-142, one fraction, contains an average of 84% oleic-linoleic acids and 16% rosin acids. It is adaptable to the manufacture of jell, liquid and dry cleaning soaps. Other uses include cutting oils, special polishes, alkyd resins, latex foam and sponge rubber, liquid buffing compounds, carbon paper, ore flotation —wherever a low titre unsaturated fatty acid is required.

Neo-Fat D-142 has an even lighter color and lower rosin acid content (6% resin, 94% oleic-linoleic acids). It can be used wherever Neo-Fat S-142 is used. Neo-Fat D-142 is especially adapted to the manufacture of alkyd resins which are non-yellowing, have superior water and alkali resistance and have excellent adhesion to metal.

Typical Analyses

	Neo-Fat S-142	Neo-Fat D-142
Mean Molecular Weight	295	284
Titre	Low	Low
Iodine Value (Wijs)	130	130
Neutralization Value	190	197
Color	2 NPA	Pale

Non-adsorbing surface active agent for buffing compounds

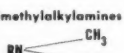
Buffing compounds are used for cleaning and polishing metal surfaces, either before or after plating or before painting, lacquering or enameling. Since it is important that no residual trace of buffing compound be left on the polished surface, ease of cleaning is an essential factor. The addition of as little as 3 to 5% of Ethomid HT/60 to buffing compounds of either the liquid or emulsion type permits easy removal by simple water washing.

Ethomid HT/60 is a non-ionic surface active chemical with unusual properties. In testing a series of surface active chemicals, Armour chemists found that Ethomid HT/60, unlike any of the other chemicals tested, lost none of its ability to lower surface tension after fine sand abrasive material was added to the water. Since the concentration of Ethomid HT/60 in solution was very low, it was apparent that this product was not adsorbed on the abrasive materials.

Ethomid HT/60 is only one in a series of 44 polyethylene oxide derivatives of fatty amines, fatty amids and fatty acids offered in commercial quantities by the Armour Chemical Division. An informative 32-page technical booklet on the Ethomeens, Ethomids and Ethofats is available upon request.

LOOKING FORWARD

Dimethylalkylamines



Dimethylalkylamines are tertiary amines. Organic bases, they enter into reactions similar to primary amines in salt formation, but do not form carbamates as do primary and secondary amines.

Solubility — Dimethylalkylamines are insoluble in water and highly soluble in the usual organic solvents. Although water insoluble, they disperse readily in water to form stable emulsions. The dimethylalkylamines readily form highly soluble amine salts with acid solutions.

Application — Dimethylalkylamines can be easily converted to quaternary ammonium salts. Because of this, they are expected to be important intermediates in the manufacture of germicides, textile-softening agents, cationic surface active agents, antioxidants, dye-fixing agents.

Availability — Reasearch samples of dimethylalkylamine will soon be available for laboratory studies. If you will use the coupon, we'll send you a sample without charge or obligation.

Armour Chemical Division Adds Industrial Oils

The Armour Chemical Division announced recently that it had taken over the supervision and sales of the Armour Industrial Oils Department. This move will greatly improve customer service by making available the facilities of the Chemical Division's large research laboratory and the services of specially trained technical representatives.

For many years, Armour and Company has been recognized as a leader in the production of animal oils, tallows and greases. Armour plants are thoroughly equipped to produce every type of animal oil for which there is a demand today.

To acquaint industry with their line of industrial oils, the Armour Chemical Division is offering a chart containing specifications on all of their industrial oils. Use the coupon below to obtain your copy —without charge or obligation, of course.

Free color conversion chart

You can obtain Armour's 8½" x 11" color conversion chart by mailing the coupon below. This chart, printed on sturdy cardboard, covers the complete commonly used color-density range. It's a time-saving reference for laboratory, technical, production and purchasing personnel.

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Lignin Progress

Lignin, unwanted byproduct of the pulp and paper industry and little more than a waste product to date, may at last be coming into its own as a source of chemical raw materials. If it proves of economic significance, years of research into lignin structure and lignin uses may eventually begin to pay off.

One potential important use for lignin was disclosed this month. J. J. Keilin, W. K. Dougherty and W. R. Cook of the West Virginia Pulp and Paper Co., Charleston, S.C., reported that lignin has been shown to be an excellent reinforcing agent for natural, nitrile and neoprene rubbers (*CIW, March 10, 1951*).

This news of a specific outlet for lignin is a cheering note at the present time while the tremendous problem of disposing of lignin wastes by pulp and paper mills is still almost entirely unsolved.

Work on lignin in recent years has proceeded on two distinct lines: Academic workers have devoted much time to a study of the basic structure of lignin from different sources; simultaneously, work has gone ahead on finding practical end uses for technical lignin. Despite the vast amount of work done on the problem to date, the fact remains that (a) knowledge of the lignin structure still rests on a very uncertain basis; and (b) fundamental work on conversion of lignin residues to useful materials is rather limited and none too successful.

Wood contains some 30% of lignin-type material which formerly was allowed to go to waste while the cellulose portion alone was used in the paper industry.

It has often been pointed out that wasted lignin—being used for its fuel value alone or else discarded entirely—amounts to 4 million tons a year in North America alone. Added to that is the problem of stream pollution, which has received greatly increased attention from various State legislatures in recent years.

Pressure on the pollution issue has led some mills to take immediate and drastic disposal measures without waiting for new advances in recovery techniques.

On such lines, for instance, Soundview Pulp Co. and Weyerhaeuser Timber Co. at Everett, Wash., have built a special 2-mile pipeline to carry their waste sulfite liquor to deep water 3,000 feet from shore in Puget Sound. Crown Zellerbach Corp., at Camas, Wash., has a somewhat similar disposal pipeline dumping the waste liquor a mile out in the Columbia River.

PULP PURIFICATION: Lignin uses grow.

Meanwhile, four Wisconsin mills, Northern Paper Mills, Rhinelander Paper Co., Consolidated, and Hoberg, are planning plants to burn calcium-base spent liquor for fuel.

The enormous quantity of wasted lignin represents a chemical raw material which potentially can rival coal tar and petroleum as a **source of organic synthetics.**

Crude lignin uses: Evaporated waste sulfite liquor solids have been used as adhesives, briquetting agents, cement, ceramics, core binders, insecticides, and fertilizer; and as materials for dyeing, emulsions, plastics, tanning, and soaps, but the amounts used have been small. It does not appear that any of their varied uses are likely to absorb more than a small fraction of the great supplies available.

Fairly extensive work has been reported recently on the use in Wisconsin and Michigan of unconcentrated waste sulfite liquor as a road binder. Tests show that the liquor not only lays dust but also improves road condition. It gives a hard, dense, smooth surface to dirt roads in dry weather, and whenever the weather is wet enough to soften the roads, they can be smoothed and resurfaced.

Waste sulfite liquor pays for itself within 20 miles of the source of supply in reducing grading and filling charges. It is also claimed that waste liquor addition to road surface can compete on a cost basis with calcium chloride up to a 150-mile haul from Wisconsin mills, where the chloride is relatively expensive.

If applied on a large scale, it has been calculated that there are over 50,000 miles of unsurfaced roads and streets in Wisconsin alone which would absorb more than twice the waste liquor produced there during the hauling season, and also solve pollution problems for the mills at the same time.

The idea of using sulfite liquor as road binder is not essentially new. Some concentrated liquor from Pennsylvania mills has been used on New Jersey roads under the trade name of "Lignin Binder" for a generation. Some unconcentrated liquor has been used too on dusty roads in mill areas in the Pacific Northwest. The use of sulfite road binder has been greatly developed in Sweden, where 60% of all roads are so treated.

In the plastics field, hardwood-soda lignin (aspen) is preferable to coniferous kraft lignin (spruce) owing to its better flow and lower melting point. In one Canadian process, in successful operation for several years, such soda lignin is used in laminating papers, which are heat- and pressure-converted to laminated plastics sold under the trade name Arborite. The thermoplastic and fiber-binding properties of lignin are also made use of in making various other board products, notably Lignolite (Marathon) and Masonite and Benalite (Masonite Corp.). With more squeezes coming in the next few months in various structural materials, greater emphasis will be placed on such products.

Fine chemicals: Aside from utilization of crude lignin-type materials, much remains to be done in recovering other useful by-product chemicals. One such potentially valuable waste product is para-alpha-dimethyl styrene (PADMS), a by-product hydrocarbon resulting from the sulfite pulping of sprucewood (*CI, Dec. 1950, p. 372*). PADMS may replace or supplement styrene.

Para-cymene, the raw material for PADMS, already exists in the sulfite industry, and large amounts could be produced if required. It has been estimated that North America could produce at least 1.3 million gallons of para-cymene a year if need be.

In the course of a far-reaching research program sponsored by the Sulfite Pulp Manufacturers' Research League at the Institute of Paper Chemistry, Appleton, Wis., on the use of sulfite waste liquor lignin as a chemical raw material, processes have been evolved for increasing outlets for commercial vanillin. To this end vanillin was investigated as a chemical intermediate for producing other commercially valuable organics.

To date, a number of new products useful as nontoxic food preservatives, disinfectants, slime control agents, preservatives in general, plasticizers, plastics, pharmaceuticals and sunscreens have been prepared and tested.

Recently, a number of new cinnamic acids have been prepared from vanillin and its derivatives. Ethyl esters of these acids have only mild effectiveness as inhibitors of micro-organism growth, but they do possess marked ultraviolet screening properties.

Several may find application for prevention of sunburn, while others are indicated for protecting cellulose, cellulose derivatives, and various plastics, films and sheets from degradation caused by ultraviolet light.

One approach to the problem of using technical lignin has been in the aeration, neutralization, and fermentation to alcohol of the sugars present in the waste liquor. Two such plants are operating, one in the U.S. and one in Canada.

Related to fermentation is the production of yeast from waste sulfite liquor. One plant has been in operation for some time, that of Lake States Yeast Corp. in Wisconsin, which operates on Rhinelander Paper Co.'s waste liquor.

But Rhinelander President Folke Becker has lately indicated that the yeast company's sales have shown a marked decline. At the end of 1950, the mill had over 1 million pounds of yeast—several months' production—in storage. High yeast sales are necessary to meet the $200,000-a-year cost of plant operation.

A novel view of the future of lignin and other "waste products" of the pulp and paper industry, is held by some specialists in the field. They believe that if and when a really workable large-scale use for lignin and other wastes is found, the emphasis in the whole industry may alter. The presently used chemical pulping methods may disappear altogether, to be replaced possibly by continuous extraction processes.

At the present time, pulp mills seek only pulps of specific qualities and in good yields. The time may come when they will strive too for optimum yields of lignins of specific structure, uniform type, and meeting definite standards. New and milder pulping methods may yield in turn better pulps in higher yields and the recovery, simultaneously, of other valuable components of wood which are now virtually ignored. Such products would include the hemicelluloses, rosins, fatty acids, tar and wax components and terpenes.

A somewhat similar point of view on modified cooking procedures leading to more efficient chemical recovery has been put forward by K. A. Taylor, director of research at International Paper in Glens Falls, N.Y.

He stressed that substantial savings could be made if we considered wood as a basic chemical raw material from which we recover cellulose fiber and various other products usable as chemical raw materials. He looked forward to a time when chemical pulping processes could be operated with shortened reaction times, at lower temperatures and atmospheric pressures, possibly with the aid of catalysts.

Lignin is still a long way from being a chemical raw material of vital significance. However, under the stimulus of industry-sponsored research, the work of academic investigations, and the rising pressure of anti-pollution groups, the day seems to be drawing nearer when wood will serve as a source, not only of pulp and paper, but of lignin products of myriad applications.

Complex Surface

Du Pont's new Werner complexes, Quilon stearato chromic chloride (U. S. Patent 2,273,040) and Volan methacrylato chromic chloride are surface agents of unique application. The former makes paper, glass and textiles water-repellent, and improves the finish and "hand" of Fiberglas textiles; the latter anchors plastics to glass in making Fiberglas laminates Close relatives hold out eventual promise of providing tailor-made surfaces for specific purposes.

As do many surface-active chemicals, Quilon and Volan contain an inorganic head and an organic tail. They differ from other agents, however, in that they depend on non-ionic coordinated bonds for adhesion to the surface, and they polymerize to form cross-linkages between the *inorganic* parts of the molecule. Werner complexes are characterized by these non-ionic bonds.*

Chromium, in particular, loves company, and isn't happy unless surrounded by oxygen or nitrogen atoms; moreover, the coordinate bonds it forms are as strong as (or stronger than) most usual chemical bonds. In du Pont's new agents the oxygens of the carboxyl group are coordinated with two chromiums and another oxygen, to give a ring structure involving a hydroxyl group and four chlorines.

* Hence "stearato" and "methacrylato" instead of "stearate" and "methacrylate."

R. K. ILER: The beginning, old filter paper.

In water solution the complex is ionized to a quadrivalent cation, which—on dilution, raising the pH, or mild heating—hydrolyzes and liberates hydrogen ions.

The hydrolyzed intermediate then dehydrates to form chromium-oxygen linkages, a process also accelerated by heat or raising the pH. The chromiums in the polymer, however, are still hungry for company and adsorb strongly on negatively charged surfaces containing polar groups.

Thus when dilute solutions of Quilon or Volan are applied to a suitable surface and heated briefly to 250 F, an insoluble, tightly held organic skin is formed. A suitable surface is one that contains hydroxyl, amino, carboxyl, carbamido, carbonyl, silicate or sulfonic acid groups, which means that glass, ceramics, cellulose, and polyamides such as wool, silk, nylon, leather and so forth are effectively treated.

The organic coating may be water repellent and more or less inert (as with Quilon), or it may contain active organic groups that react with plastics or other organic materials.

Old filter paper: It started in 1940 when Ralph K. Iler and Howard E. Hanthorn (U.S. Patent 2,307,045), of du Pont's Grasselli Chemicals Department, put some chromyl chloride on an old piece of filter paper. After they dried it off, they found the paper was water-repellent.

However, Iler later found that with new filter paper and chromyl chloride the effect was much less pronounced. He concluded that Cleveland air had left a grease film on the paper; the hexavalent chromium oxidized the

grease to a carboxylic acid; the resulting trivalent chromium coordinated with the carboxyl group and the cellulose of the filter paper; the complex made a water-repellent surface. Active development was undertaken in 1945, and Quilon and Volan came on the market in late 1948.

Water-soluble water repellent: Because of the solubility of the Werner complexes, Quilon is a real paradox: a water-soluble water repellent. It is supplied as a solution in isopropyl alcohol and water, which is diluted further with water to 0.5%–9% before application.

Ease of application, low retentions (0.6 lb. of the chemical per 10,000 sq. ft.), and non-toxicity have made it popular with paper makers. Several large paper producers use it in making bags for ice and wet vegetables. Others apply it to poster paper for outdoor signs, and to paper for wrapping meats. It also anchors wax firmly to paper surfaces. Paper treated with Quilon has increased wet tear resistance and ability to maintain strength when in contact with water for long periods of time.

In the adhesives field it solves some problems and creates others. Resin-base adhesives are needed to stick together surfaces treated with Quilon; on the other hand, if Quilon is mixed with certain adhesives, particularly the polyvinyl acetate types, the resulting bonds are highly resistant to water. The anti-sticking qualities of treated surfaces are exploited in making specialty tapes and labels.

Quilon is used in a process for treating Fiberglas curtains and draperies; it gives the fabric water repellency and a nice "hand." (*CI, October 1950 p. 604*). Military uses may include treating V-board for overseas cartons, and as a possible candidate in the National Security Industrial Association's search for "icephobic" coatings (*CI, October 1950 p. 559*).

Glass-plastic bond: Volan methacrylato chromic chloride is not a water repellent, because it has a double bond in its organic tail. For the very same reason, however, it makes an effective bridge between an inorganic surface and an organic material.

So far its chief use, developed by Owens-Corning Fiberglas Corp., has been in the manufacture of glass-plastic laminates for things like washing machine tubs, boats, fishing rods, and so on.* The chromium head grabs on to the silica, and the methacrylato tail reacts with the polyester plastic.

Despite their promise as specialty chemicals, the total production of Quilon and Volan has not made any real hole in the supply of scarce chromium, and no immediate shortage of them is foreseen.

A variety of other similar complexes, most involving monocarboxylic acids, have been screened in the laboratory, but only the stearic and methacrylic acid derivatives have reached commercial production. The others hold out a lot of promise, though, since with them it is possible to make a surface with very nearly any desired reactive properties.

* For news of a competitive bonding agent see CIW, March 10, 1951, p. 10.

Petrobenzene

Benzene output in the United States will soon hit a rate of over 250 million gallons per year. John L. Lewis and Phil Murray permitting, 180 million gallons of the total will come from coke ovens—a rise of 10% from present production. The rest, about 72 million gallons, will come from petroleum.

Eight refineries of seven companies will produce these 72 million gallons. Three are now producing benzene, two others have been granted certificates of necessity, and two more have applied, and it is expected that one other application will be made in the near future. (This is in a very early stage of engineering and further comment at this stage would be sheer speculation.)

But petroleum benzene will not be cheap. Present production of benzene from petroleum is reported to be selling for 40¢ per gallon. Because of increased construction costs and faster payout (five-year amortization granted in the certificates of necessity), price will be appreciably above 40¢. Just how much, petroleum benzene producers refuse to say; but, when pressed, suggest a price of about 55¢ per gallon.

Some feel that even this figure is too low, citing the competitive value of benzene in gasoline as an anti-knock agent and, for aviation fuels, its good rich-mixture performance. Variability in benzene content of the feedstock and the many other factors involved make this figure obviously no more than a good "guesstimate" at this early date.

Still not enough: With the exception of Shell's Dominguez plant and Standard of Indiana's Whiting plant, petroleum benzene plants are being erected either near large benzene users—e. g., styrene and nylon producers in the Southwest—or by companies with large internal demand for benzene: Standard of California and Atlantic both use large tonnages to produce synthetic detergents.

Even with this large increment in production, benzene will continue to be extremely tight during 1951 and 1952. When this new supply comes on the market, it will merely replace the motor benzene which is now being imported. Those who know benzene best feel that the contemplated increase is probably insufficient to meet requirements. But at 55¢ per gallon, benzene may price itself out of some markets, and that will help equalize supply and demand.

Petroleum Benzene Production Units

Company	Location	Capacity (Millions of gallons per year)	Source of Feedstock
Now Operating			
Continental Oil Co.	Ponca City, Okla.	1	
Pan-American Petroleum & Transport Co.	Texas City, Texas	5†	Hydroformer
Shell Oil Co.	Dominguez, Calif.	6	"
Certificates of Necessity Granted			
Pan-American Petroleum & Transport Co.	Texas City, Texas	7.5†	"
Standard Oil Co. of Calif.	El Segundo, Calif.	13	Platformer
Standard Oil Co. of Ind.	Whiting, Ind.	10	Hydroformer
Certificates of Necessity Filed or Undergoing Study			
Atlantic Refining Co.	Philadelphia, Pa.	7	Own Process
Esso-Standard Oil Co.	Baton Rouge, La.	<10	Existing Stocks
Pan-American Petroleum & Transport Co.	Texas City, Texas	12*	Hydroformer
Shell Oil Co.	Houston, Texas	13	Platformer
	Total	72	

* Planned total capacity at Texas City, including present unit.
† Not included in total.

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2. Nitro-olefins—treatment of nitroesters with sodium carbonate (see above) or condensing primary NP's with aromatic aldehydes.

3. Nitroamines—from NP's, formaldehyde, and amines by Mannich reaction.

4. Diamines—(a) reduction of nitroamines (see above), and (b) reduction of dinitroparaffins made by condensing nitroparaffins with ketones, or reacting chloronitroparaffins with alkali salt of an NP.

5. Cyclic Nitroalcohols—condensing primary nitroparaffins with cyclohexanone.

6. Alkyl Hydroxylamines—formed by mild reduction of primary nitroparaffins.

7. Heterocyclic Nitrohydroxy Derivatives—prepared by condensing heterocyclic aldehydes with an NP.

8. Beta-Dioximes—condensing three molecules of an NP in presence of a weak base.

9. Trialkyl Isoxazoles—hydrolysis of Beta-Dioximes (see above).

10. N-Alkyl Hydroxylamines—mild reduction of primary NP's.

11. Alkylidene Succinic Esters—condensing NP's with alpha beta unsaturated acid esters.

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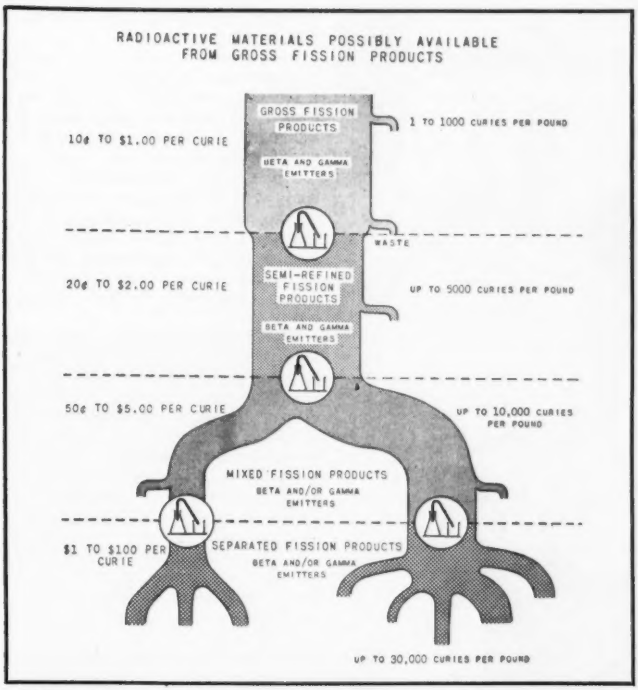
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Stanford Research Institute, under AEC sponsorship, has studied these products—reports to industry—invites industry to think hard about profitable applications.

In industrial laboratories, investigators are quietly learning to use radioactivity to solve a variety of industrial problems—slowly shaping a new industrial revolution as they discover the potentialities of a new force released on a large scale only six years.

That revolution will move faster as the result of a report issued early this week by Stanford Research Institute.

The Institute undertook an Atomic Energy Commission-sponsored project to provide industry with information on availability and possible uses of fission products—the "hot," complex debris remaining after the fission of uranium atoms in nuclear reactors.

Mixture of isotopes: Chief characteristic of the "gross fission product," as the AEC terms it, is that it is a mixture of many isotopes ranging in atomic weight from 72 to 162—including strontium, yttrium, zirconium, technetium, cesium, barium, cerium, and several others; and a large proportion of them are radioactive.

The AEC now has vast quantities of these products stored in underground concrete vaults, and understandably it would like to turn them to good account.

The problem is to find or develop applications which don't require pure isotopes—such as the AEC now makes by radiation and distributes for research purposes.

Solution is to find uses for radioactivity *per se*, without regard to the chemical properties of the emitting isotope.

Lots of ideas: The Institute has come up with a lot of ideas. They're all tentative, of course, for the products themselves have not been available for evalution.

One property of gamma radiation that may be exploited as its deadly effect on micro-organisms. Possible applications are sterilization of foods, serums, medical supplies and drugs in their containers without use of heat. Since radiation doesn't raise the temperature of the processed material, foods might be pasteurized without losing fresh-food flavor.

Less-penetrating beta radiation might be used for surface sterilization — of tomatoes, for example, to slow spoilage from mold or mildew.

Chemical "catalysis": Of more direct interest to the chemical industry is the ability of radiation to induce chemical change.

Reactions involving free radicals can be speeded with radiation, just as some reactions used industrially today are promoted by light. Low-cost radiation may well make some known laboratory reactions commercially feasible.

"Radiolysis" is another industrial possibility. Water is broken down by radiation to hydrogen, oxygen and hydrogen peroxide.

Some types of polymerization—probably involving free radicals again —are promoted by radiant energy.

Halogenation and oxidation are often helped along by radiation; it is conceivable that oxidation of hydrocarbons may become an industrially important outlet for fission products.

Fluorescent lights and similar electronic tubes require a voltage build-up to initiate ionization, thus causing an operational delay. Incorporation of a small radioactive source would keep the contained gas perpetually ionized, thus giving quicker starts at lower voltage.

* Radioactivity in curies per pound depends on source, age and composition. Actual cost, within indicated range would be a function of various factors (see text). Chart based on estimates made by Stanford Research Institute with guidance of AEC contractors having experience with fission products.

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The ionizing effect may also improve efficiency of electrochemical processes and speed flame propagation.

As phosphor activators, fission products may economically extend the "glow in the dark" principle, long familiar on clock and watch faces, to billboards, highway markers, house numbers and similar uses.

Tracing and instrumentation, already well developed, are now based on the use of single, relatively pure isotopes—which indeed appear most suitable for such applications. It may be possible, however, to develop techniques wherein the cheaper mixtures can be used.

Cost is low: Cost estimates (*see diagram*) can't be pinned down very specifically, for there are too many unknown factors involved: potential demand, extent of purification found to be required, and the AEC's ultimate pricing policy.

Assuming a reasonably large demand, Stanford has estimated cost (not to be confused with sales price) of gross fission products—concentrated only by water removal—at 10¢ to $1 per curie. Semi-refined, to remove some bulk non-radioactive contaminants and thus increase specific activity, the material would cost 20¢ to $2 per curie. Separation of the gross product by chemical means into groups of isotopes would raise costs to 50¢ to $5 per curie. Technical-grade isotopes—individual isotopes of reasonable purity—would cost $1 to $100 per curie. Specific activity would increase greatly, of course, with each purification step.

Vast potential: Millions of curies' worth of fission products have been and are being produced by the atomic energy program. It is likely that production will increase as more and more atomic energy is harnessed for non-bomb uses. The underground reservoirs at the Hanford Works represent a vast, untapped "unnatural" resource, the utilization of which is a challenge to industry—and the chemical industry in particular. The underground atoms at Hanford are the seeds of a far-reaching industrial revolution.

Ore Assay

A new method of identifying opaque minerals, called "the contact print method", has been developed in India.

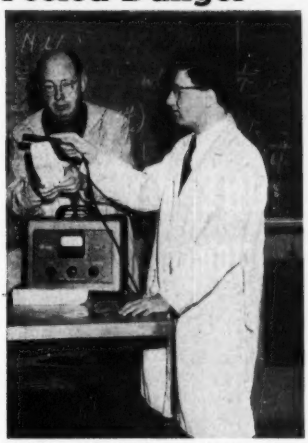
To obtain the print which gives identification, photographic paper impregnated with a selected reagent is placed on the polished surface of the mineral specimen under even pressure.

RESEARCH. . . . . .

If the mineral is a conductor, the electrographic process is used to reduce the time of contact. The intensity of current should be less than 50 milliamp., the voltage about 2-6. A bakelite graphite mixture (100 mesh) 80-20, is recommended for mounting the mineral. The method was tried out on such ores as niccolite, pyrite, chalcopyrite, and cobaltite.

Although further work still has to be done in the selection of suitable reagents, it is believed that the method will prove useful in mining and ore-dressing plants for studying the nature of the concentrations and tailings.

Peeled Danger



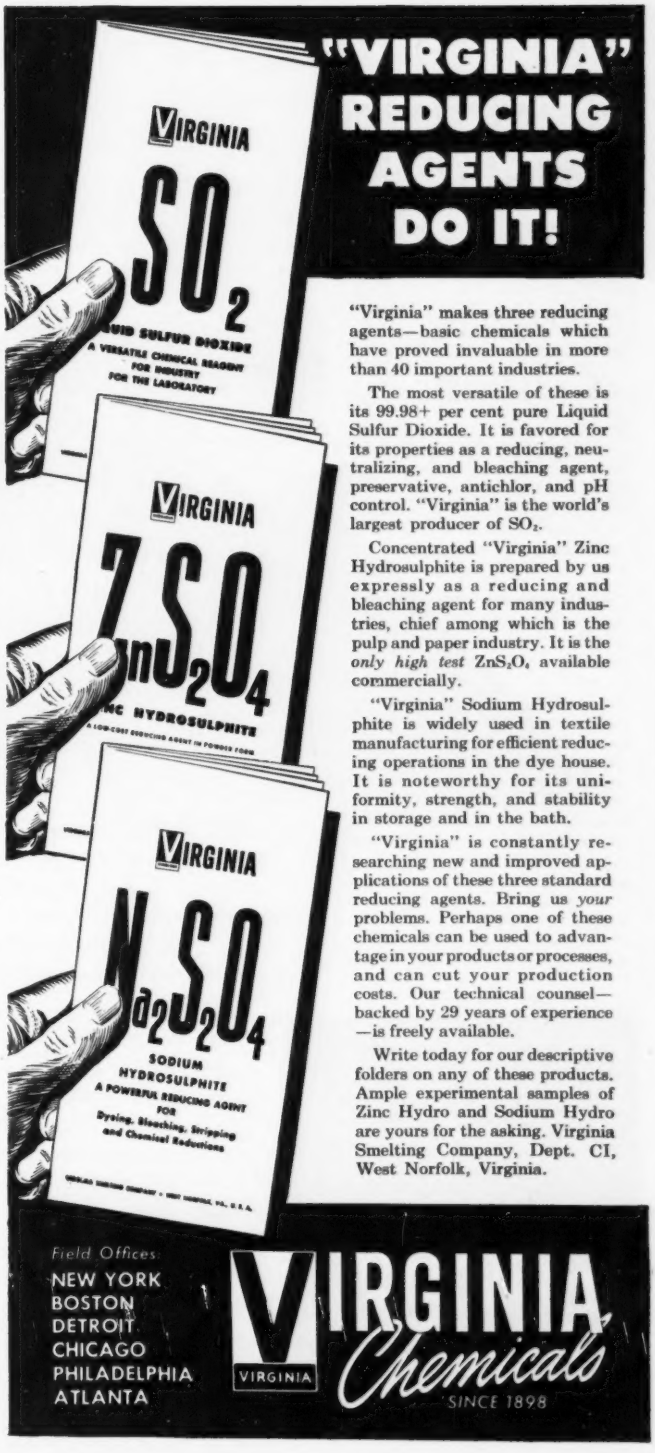
PEACH AND KARP: An alkali wash removes "hot atoms."

Latest Atomic Energy Commission word on protective coatings for decontaminable structural surfaces recommends strippable vinyl-base materials.

Once dangerous radioactive products have been absorbed into wood and stone, effective removal is virtually impossible. Only practical safety measure is to prevent absorption.

Protective coating of polyvinyl acetate, developed by the new Atomic Radiation Control Corp., is specifically intended for decontamination problems. Readily applied by brush or spray, it forms a tough, impermeable, transparent film. In case of contamination, film (with contaminant) is easily removed by mild alkali solution.

According to ARC President Marvin I. Karp and Research Director Harry L. Peach, the coating will be of real value in protecting radio-chemical installations. They even make a good argument for its use on vital buildings as a means of decontamination after atomic bombing.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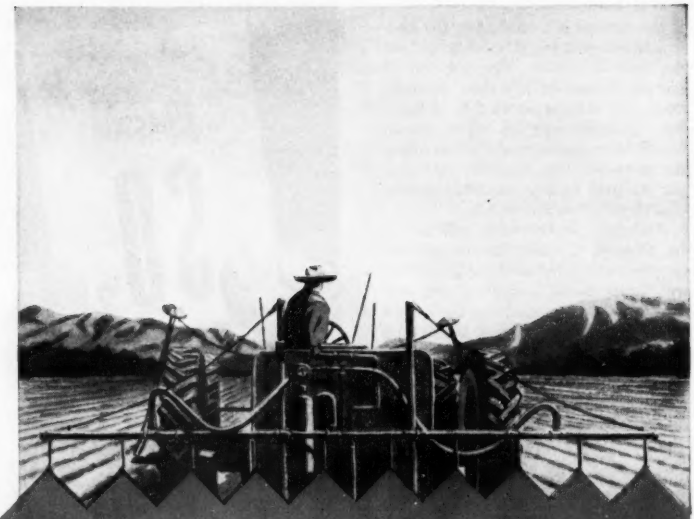

ISOPROPYL AMINE dry
salt formulation

EASY TO MAKE — A tested formulation contains 73 per cent by weight 2,4-D, 23.4 per cent Isopropyl Amine, and 3.6 per cent citric acid. It is prepared by adding the anhydrous amine to a benzene slurry of the acids followed by filtration and drying. (If preferred, aqueous *concentrates* containing 4 pounds of 2,4-D per gallon can be made using Isopropyl Amine.)

EASY TO USE — The formulated dry salt is a free-flowing crystalline material that is completely stable in storage up to 150°F. It dissolves easily to a 3 per cent solution in water of hardness as high as 1,100 ppm. (as $CaCO_3$). No other additives are necessary and the formulation has the normal activity of amine salts of 2,4-D toward plant growth. Ordinary washing removes amine salt residues from spraying equipment needed for other service and spray nozzles remain clear.

LOW COST — Isopropyl Amine is economical for this use due to its low cost and low equivalent weight. The amine is shipped in anhydrous form, thus saving you the cost of storing and handling an aqueous solution.

ADDITIONAL INFORMATION — For additional information or a sample of Isopropyl Amine, call or write your nearest Carbide and Carbon Chemicals office.

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Liquid Detergent Surge

P & G's liquid detergent Joy has just moved into three big Eastern markets as national distribution nears completion.

And this week a new Glim, its composition quietly modified from nonionic to anionic type, began appearing in the New York area.

These moves plus new brands of liquid detergents indicate a growing consumer acceptance of such products. Soapers and detergent makers are keeping one eye on the leaders, the other on their own development work.

P & G's McELROY: Soapers want to keep his Joy in sight.

Rivals are particularly leery of letting Procter & Gamble get too far ahead. They look at Tide, pre-eminent among "heavy duty" synthetics, and shudder to think of the dent Joy will make in the "light duty" field if women continue to be weaned away from traditional powder products. And with its promotion-wise president, Neil H. McElroy, P&G will not spare money to make the effort. (It spent $6 million on Tide the first year it went national.)

Joy is not the first nationally distributed liquid detergent; Glim, made by General Aniline & Film*, was. P&G, however, is one of the three titans of the soap industry, and its decision to go ahead with Joy in a big way is shaking some skeptics who doubted the market potential of such products. The two other big soap companies, Lever Bros. and Colgate, have not yet broken with liquid detergents, but they, like everybody else in the industry, are re-examining their positions and possible products.

Although Joy may cut into their sales initially, the smaller companies selling liquid detergents in limited areas probably stand to gain in the long run from the new promotion. It will make housewives conscious of the new dishwashing products, increase interest in and sales of all brands. Some of them are doing very well against Glim and Joy in their own markets anyway. A few of these are: Sky (made by Newell-Gutradt, San Francisco), which has California as its present marketing goal; Sprite (Sinclair Manufacturing, Toledo), being sold in the Toledo area; and Alli (Lincoln Industrial Chemical, Lincoln Park, Pa.), distributed in Eastern states. The latter, introduced in 1947, expects to triple sales this year.

Beef about bottles: Principal basis for pessimistic views of liquids' chances against powders has been that the product must be measured out of a glass container. It's pretty difficult to prevent some dripping down the sides, and in wet hands, the bottle is slippery. The danger of spilling or breaking the container is great. Also, if the detergent drips on a shelf, and is left there, it may remove the paint.

Moreover, the liquid is concentrated, and is measured out by the capful or spoonful. There's a tendency for the housewife to feel this isn't enough, to pour more into the dishpan. This gets to be expensive. Powdered products, on the other hand, have builders in addition to the synthetic detergent base, are bulky. A little more or less in the dish water doesn't make much difference.

Some of these objections have been answered by bottle design. Glim, when it was first introduced in 1946, was packaged in a 4-oz. "upside down bottle" fitted into a container that made it easy to hold and lessened dripping. Soon after GAF sold the product to B. T. Babbitt the detergent was put in a tall 6-oz. bottle with finger grips on it, and packaged in a carton. P&G, too, has taken this into consideration for the lower half of the Joy bottle is corrugated to give a better grip. Another possible solution to this problem is the use of unbreakable plastic – very likely polyethylene – bottles.

On the matter of measuring and dripping, producers think that education will do the job. Women have to measure out many liquids in cooking; they can get used to doing it in washing dishes, and do it without slopping or using a measure if that is objectionable.

Started with nonionics: Nonionics have been most readily usable as liquid detergents, but they lack the foaming characteristics the consumer demands, and they don't lend themselves to building for a variety of cleaning jobs as do the anionics. The current modification of Glim's active ingredient (it was a condensation product of ethylene oxide and a phenol) is GAF's answer to consumer complaints that the product didn't foam enough. GAF won't be specific about the new composition, but it describes it as now being "anionic" and as good a suds producer as any dishwashing product on the market. A likely modification would be building some polar groups into the structure. Undoubtedly the public will be hearing about the new Glim when the old bottles are sold out.

Joy reflects its soap-company origin in that it is being sold as a "new liquid sudsmaker." It has been the best liquid detergent on the market from the suds standpoint. P&G naturally doesn't say what the product is, but it is generally presumed to contain an alkanolamine lauryl sulfate (about 45%), monoethanolamine coconut fatty acid amide (15%) and equal parts of alcohol and water with a little perfume.

Blends of anionics and nonionics are the basis of most of the lesser known brands on the market. There are none on a national scale, but they bulk large in the aggregate. One industry estimate places their volume second, with Joy first and Glim third. The anionic portions are generally alkyl aryl sulfonates, and the nonionics are of the alkylated aryl polyether alcohol type. In addition to those on the market,

* Glim was introduced in York, Pa. by GAF in 1946; the next year markets were expanded to include Washington, D.C. and Philadelphia. GAF sold the Glim to B. T. Babbitt in mid-1948. Under the agreement, GAF makes the material but Babbitt handles distribution and promotion. Within a year after Babbitt took over, national distribution was completed.

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new blends can be expected for producers of the largest volume synthetic detergents—alkyl aryl sulfonates—are pointing research efforts in that direction.

Haze a problem: Main problem in adapting sodium alkyl aryl sulfonates to liquid formulations is the residual sodium sulfate from neutralization following sulfonation. The detergent itself is sufficiently soluble, but when the salt concentration gets up around 5%, the solution gets cloudy. Desalting must be carried out to make an acceptable liquid detergent base.

Ethanolamine salts of alkyl aryl sulfonic acid themselves are viscous liquids. In preparing these, the excess sulfuric acid used in sulfonation is diluted to separate it from the alkyl aryl sulfonic acid, and the latter is then neutralized with an organic base such as triethanolamine. At least one such product has been put on the market: Atlantic Refining Co.'s Ultrawet 60 L, which is described as an organic salt of alkyl aryl sulfonic acid. This is a high active content product which stays clear as low as 14-15 F. Atlantic is not in the retail picture itself, but like most detergent makers, supplies soap companies with the basic materials.

Still light duty: All of the liquid detergents now being marketed are recommended for washing dishes and fine fabrics. They do an excellent job, and being superior grease cutters, can also wash the family car. This puts them into competition with both synthetic detergent and soap products designed for this "light duty" as well as with the all-purpose detergents. Although some in the industry feel that the future of liquid synthetics is still clouded, this field for which Joy, Glim *et al.* are now shooting represents about 10% of the soap market—a worthy goal. No liquid detergent formulated to do "heavy duty" washing—family wash, etc.—is yet in sight, but there's no telling where current activity will lead.

•

Glass container freeze: NPA is considering an order requiring "simplification" of glass containers. If preliminary studies show an order is necessary to increase production of glass containers, existing designs may be frozen.

Purpose is to conserve raw materials, but usually simplification permits faster production and thus uses more raw materials.

NPA's action may be futile however, because the major problem facing glass container makers is a shortage of transportation facilities.

Familiar Face

Manufacturers and formulators of insecticides will find a familiar face behind a new desk at U.S. Dept. of Agriculture's Bureau of Entomology and Plant Quarantine as a result of the appointment of H. L. Haller as assistant chief of the Bureau. Dr. Haller, a 25-year USDA veteran, will handle chemical aspects of the Bureau's activities in development, manufacture and use of insecticidal and related materials. During World War II he directed and coordinated experimental work on such products.

Pliable Abrasive

There's something new in Old Dutch Cleanser: an improved formula based on heat-treated volcanic ash and a better grease solvent which doubles its efficiency. Key to the better performance is the pliability and high absorbency of the abrasive particles.

Cudahy Packing Co., Old Dutch manufacturer, tabs the new form of abrasive "activated seismotite." (Seismotite is its coined term for lava ash of a particular grade, mesh size and color.)

Particle pliability imparted by an activating process results in grease and dirt removal from crevices otherwise hard to clean. Thus the improved formulation is claimed to dislodge accumulations of grime in the microscopic valleys and hills of apparently smooth porcelain, leaving a whiter and brighter surface.

Discovery of the "activated" abrasive was another of those unexpected dividends that often is forthcoming in the search for something else. Cudahy wanted to whiten its seismotite and turned the problem over to Armour

SPECIALTIES. . . .

Research Foundation. Researchers noticed that after being given the treatment they developed, the seismotite was more active in cleansing. Tracking down the cause, they found that a new pliability of particles and a greatly-increased absorbency were responsible.

Lucky base: Fortunately for Cudahy, its product contained lava ash, or seismotite, as the abrasive mineral base. (Scouring powders are generally composed of an abrasive, soap or synthetic detergent as a grease dissolver, and a grease-suspending or carrying agent.) This could be activated by the Armour process, but other commonly used materials such as silica, tripoli, feldspar, etc., were unaffected.

The actual process involves heating the lava ash with a jet flame and screening to a closer tolerance than previously. Expansion occurs which results in greater surface area and absorbency, increased pliability, and the originally sought lighter color. This increased absorption quality made necessary a change to a more powerful grease dissolver to maintain balance in the product. Five years of research, still continuing, resulted in the souped-up cleanser, which Cudahy says does more and better cleaning.

•

Semi-gloss enamel: Du Pont's new Duco semi-gloss enamel will be available for sale this spring. It is unusual for an enamel in that it combines low sheen with the durability usually found only in high gloss products. The finish is for use on woodwork, walls and ceilings. It will be offered in a range of pastels and deep tones.

•

Slime control: Monsanto Chemical Co. is now marketing its new product, Santophen 45, a technical grade of sodium trichlorophenate, in experimental quantities. It is used to control slime in industrial cooling waters.

•

Luminescent tape: Century Coating Co., Long Island, N.Y., has developed a luminescent packaging tape. It can be used as a sealing tape for any type of box or container, enables an object to be readily identified in the dark. The tape is coated with a plastisol made from a Geon paste resin.

PICTURES IN THIS ISSUE:

Cover (top), 18—Lynn Crawford; cover (bottom), 27 (top, bottom right)—S. E. Karson; 27 (center, bottom left)—Russell C. Aikins; 36—Associated Press; 30 (top, right)—Wide World.

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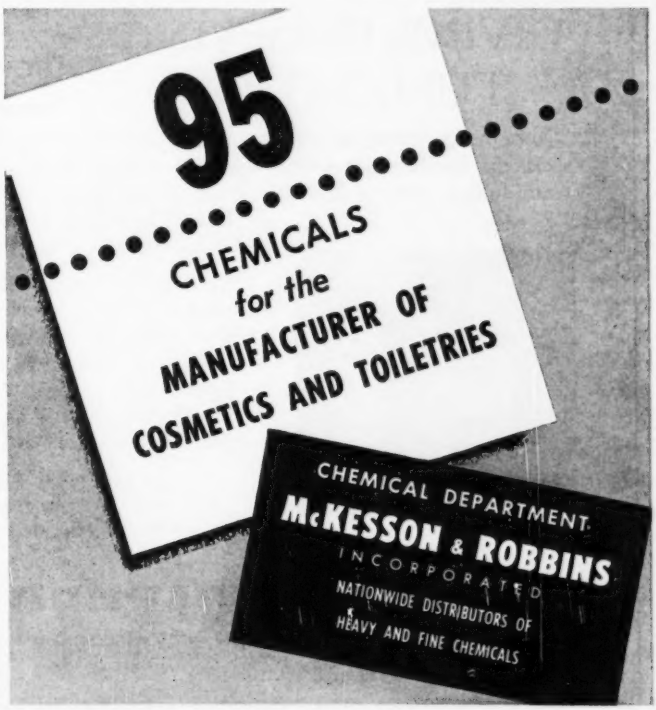
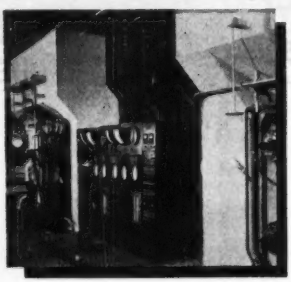


ὄΐσε θέειον, γρηΰ, κακῶν
ἄκος, ὄΐσε δέ, μοι πῦρ,
ὄφρα θεειώσω μέγαρον
Odyssey, xxii, 481

DIVINE, PURIFYING FUMIGATION

"QUICKLY, O! DAME, BRING FIRE THAT I MAY BURN SULPHUR, THE CURE OF ILLS." So spoke the warrior, Ulysses, after forcefully ridding his home of Penelope's suitors on his return from the siege of Troy. Homer called burning Sulphur, "Divine, Purifying Fumigation". Indeed, Sulphur so impressed the ancients that they used it even in their religious rites.



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SPECIALTIES. . . .

Heat-resistant finishes: Two silicone-based finishes for applications requiring high heat resistance have recently been introduced by two different companies.

One, Sicon, is the product of Midland Industrial Finishes Co., Waukegan, Ill., The company previously sold a silicone finish under the name Mico, but the formula has been modified and the new trade name adopted. It can be applied by brush, spray or dip; is stable at temperatures up to 1000 F.

The other, Heat-Rem H-170, manufactured by Speco, Inc., Cleveland, is an aluminum paint that can withstand temperatures up to 1700 F. It is a companion product to the company's standard Heat-Rem, which is sold for jobs in the 1,000-1,500 F range.

•

Copper brazing paste: Glidden Co.'s Metals Refining Co. Division, Hammond, Ind., has developed a new formulation for its copper brazing paste, Cubond. Containing a small amount of iron, it is claimed to have these advantages over conventional materials: It can be applied with more speed and less waste; the brazed joints are stronger because the more sluggish molten brazing metal improves the filleting of joints and eliminates the "notch" effect.

It is available in either a water-thinned or petroleum-thinned base.

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Tums expands: A new five-story building with provisions for a sixth floor over part of it will add 45,000 sq ft of space to the St. Louis manufacturing facilities of Lewis-Howe Co., manufacturer of Tums and NR tablets.

•

Name change: Broadened activities are responsible for Brooks Boiler Treatment Co., Cleveland, O., changing its name to Brooks Chemicals, Inc.

•

Floor cleaner: Germelim is the name of the new liquid floor cleaner that also disinfects being introduced by Davies-Young Soap Co., Dayton, O. Active ingredients are potassium laurate, potassium myristate and *o*-benzyl-*p*-chlorophenol. It is diluted 30 to one with water for use.

•

Plastic metal coating: U. S. Rubber is now producing its new air-drying plastic protective coating, U.S. Royalguard, on the pilot plant scale at its Providence, R.I., plant. The new product is characterized by its high film flexibility combined with good adhesion and impact resistance. It can

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Cloud Point	39° — 45°F.
Color Lovibond 5¼" Red	1.0 — 2.0
Color Lovibond 5¼" Yellow	8 — 12
Unsaponifiable %	1.5% max.
Saponification Value	198 — 201
Acid Value	197 — 200
% F.F.A. as Oleic Acid	99.0 — 100.0
Iodine Value (Wijs)	89 — 92

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be used on steel, aluminum, concrete, hardwood or composition board, and is expected to find wide application in the process industries. Containing no plasticizer, it retains its flexibility throughout service life.

•

Imitation flavors for drugs: Work done at the College of Pharmacy, University of Florida, indicates that some imitation flavored syrups are as good as or superior to the official flavors in masking the unpleasant tastes of ammonium chloride and quinine hydrochloride.

For masking initial salty taste of ammonium chloride, the following syrups were best: raspberry, N.F.; imitation raspberry, acid (citric) added; imitation wild cherry, acid added; imitation grape, acid added; cacao, N.F.; cherry, N.F.; imitation maple; and glycyrrhiza, USP. For masking ammonium chloride's obnoxious taste, the best were imitation cream soda and imitation maple syrups.

Best of all vehicles for covering bitter taste of quinine hydrochloride was cacao syrup, N.F. Citric acid did not enhance disguising effect of the imitation fruit flavored vehicles.

•

Wood glue: Libbey - Owens - Ford Glass Co., Toledo, has developed a new glue for use as a wood adhesive and abrasive binder. Designated 530-11L, it is a modified urea resin sold in liquid form said to cure rapidly in continuous lumber core bonding operations. It can also be used in some cold press assembly gluing jobs. Color is light tan to brown.

•

Insecticide goals: In recent government hearings on farm machinery and fertilizer, the U.S. Dept. of Agriculture gave these as the needs for the 1951 crop year: DDT, 58 million lb; benzene hexachloride, 65 million lb; toxaphene, 45 million lb; chlordane, 3 million lb; parathion, 7 million lb; 2,4-D and 2,4,5-T weed killers, 22 million lb (acid equiv. basis); lead arsenate, 37 million lb; calcium arsenate, 52 million lb; elemental sulfur, 180,000 T.

•

Vitamin B_{12} tablets: Sharp & Dohme, Inc., will release this week its new Redisol tablets as a convenient oral dosage form of this appetite-stimulating vitamin. They are equivalent in activity to 25 mcg. of crystalline vitamin B_{12}. They are especially adaptable for children since they dissolve rapidly in fruit juice, water or milk and can be consumed that way if that is preferred.

SHIPPING.....

CENTRAL CONTROL DESK: Two-way communication is secret to rapid processing.

Fast Freight

Officials of the Republic Carloading and Distribution Company are enthusiastic over their new "electronic" freight checking system. It has proved itself after an extensive trial run at the company's Houston terminal. Plans now call for extension of the method to terminals in New York, Chicago and other industrial areas.

The Houston terminal is an important distribution center for the Southwest. Freight is received there for delivery to manufacturing plants and stores in the Houston area, and for reshipment to other Texas cities.

Freight processing: Under the new checking system, freight comes in on one side of the warehouse, is stored momentarily in the warehouse, and loaded on trucks on the other side.

The key man in the new set up is the central control operator. He receives lists of incoming freight along with instructions for its disposal.

Communication is maintained between the control desk and the "breakout man" (unloading the freight car) by means of a 2-way speaker with an electronic amplifier. The control unit (Stromberg Carlson IM-20) permits communication with any of the breakout men in the six cars that can be unloaded simultaneously. And the control clerk can regulate incoming calls so but one comes in at a time.

The breakout man opens and enters the box car. A speaker microphone that can be hung in the door of the car enables him to call the control desk for instructions. The control clerk tells him how to palletize and mark the contents.

The warehouse is divided into seven general divisions—one for each of the five geographical areas of Houston, one section for freight destined for a connecting rail or truck line, and a section for C.O.D. packages. The markings on the pallet indicate to the fork truck operator the exact place to store the pallet.

As soon as the breakout man has loaded a pallet, he informs the control man, who flashes a red light in the warehouse opposite the box car. The light is a signal to the man on the fork truck that a pallet is ready.

On the other side of the warehouse the trucks of the forwarding company line up, prepared for loading. The driver is handed a batch of freight bills by the warehouse foreman, who has received them from the control clerk. Each bill corresponds to a pallet in the warehouse. And as the driver receives a pallet he gives a copy to the fork truck operator, who retains them until the truck is loaded. He then turns them over to the railroad representative as a receipt.

Advantages: Designed to speed the processing of freight, the new system has done that . . . and more. It is now possible for one man to do the work of six checkers. Another important advantage is the precision routing of goods in process so that an article can be located at any given time.

Fourteen men are now able to handle the 4 million lbs. of freight that are processed every month. And although the system is used exclusively on incoming freight, there is no reason it can't be adapted to handle outgoing shipments.

Go the scientific way...go MGK

Insecticide Concentrates for

AEROSOLS

DUSTS

SPRAYS

We offer *complete formulas* . . . ready to put right into your aerosol bombs or your retail packages or . . . *combinations* of insecticides and synergists that leave you only the minimum of processing to do or . . . the purest toxicants and synergists *in their primary forms.* MGK has the *best* of whatever you want.

Scarabaeus sacer
Sacred beetle
Model for Egyptian carved stone amulets and scarabs.

THE PIONEERS OF PYRETHRUM AND ALLETHRIN

For complete information write 1709 SE 5th St., Minneapolis, Minnesota

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LITHIUM FORMS Pioneered by METALLOY...

LITHIUM HEADQUARTERS
Sept. 1946 . . . LI AMIDE
Feb. 1947 . . CARTRIDGE
April 1947 . . . . . WIRE
Oct. 1948 . . . . . SHOT
June 1949 . . . . . CUP
Sept. 1949 . . . . RIBBON
1951 . . . . ?

To Aid Industry, Metalloy Has Pioneered the Manufacture of Lithium in These Forms:

Lithium Metal			
Cup	1/5 lb.	Shot	4-8 Mesh
Extruded Rod	½" & ⅝" Dia.		
Wire	⅛" Dia.	Ribbon	¼"
Cartridge (Encased in Copper Tubing)	4.50, 9.0 & 100.0 Gram		2.23.

Lithium Hydride	Lithium Amide
Fine Ground	Crystalline

SPECIALISTS. Metalloy has developed special forms of Lithium and Lithium Compounds for many specialized applications. Check this list of over expanding Lithium Salts, exclusive with Metalloy:

LITHIUM

Aluminate • Cobaltite • Manganite • Silicate Titanate • Zirconate • Sirconium • Silicate

AS A CONTRIBUTION TO ORGANIC RESEARCH, Metalloy's technical staff has prepared an "Annotated Bibliography on the use of Organolithium Compounds in Organic Synthesis." Annual Supplements will follow.

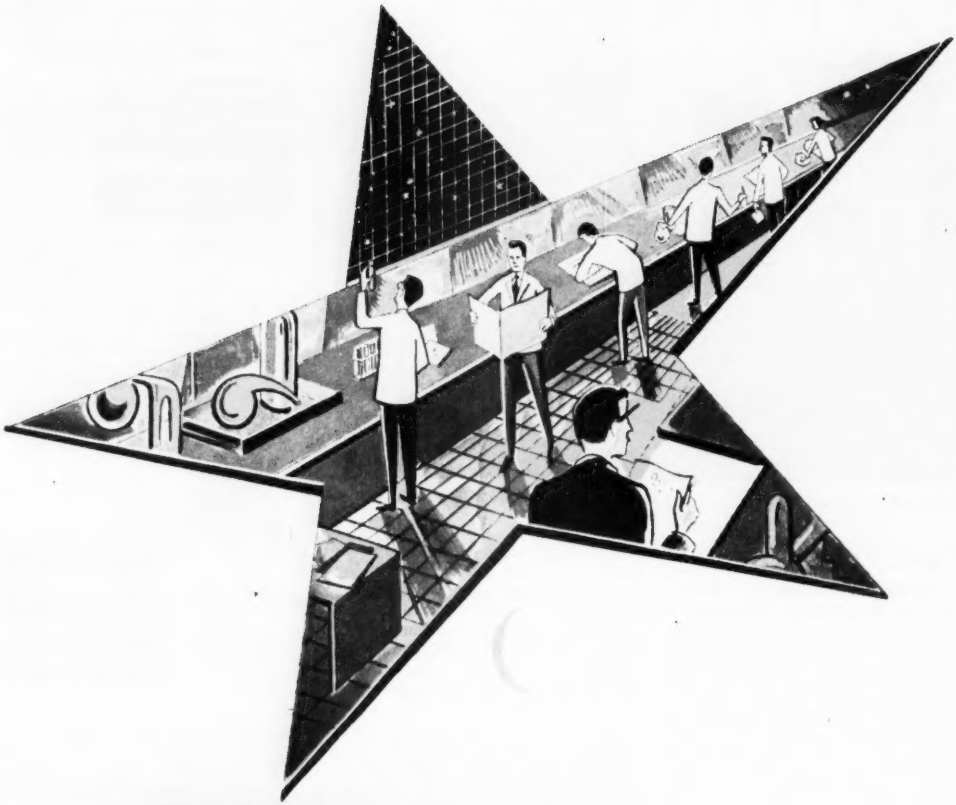
Let Metalloy and Lithium go to work for you today. Write Dept. A for specific data on any of the above.

IF IT'S LITHIUM — IT'S METALLOY

METALLOY CORPORATION

RAND TOWER MINNEAPOLIS, MINN.

Subsidiary LITHIUM CORPORATION OF AMERICA, INC.



Night life.. at Stauffer's . . . .

Stauffer Products

BHC (Benzene Hexachloride)
Borax
Boric Acid
Boron Trichloride
Carbon Bisulphide
Carbon Tetrachloride
Caustic Soda
Chlordane
Chlorine
Citric Acid
DDT (Dichloro Diphenyl Trichloroethane)
Ethylene Trithiocarbonate
Silicon Tetrachloride
Sodium Hydrosulphide
Sulphur-Specially Processed For All Industrial and Agricultural uses.
Sulphur-Insoluble (For Rubber Compounding and Other Uses).
Sulphur Chloride
Sulphuric Acid
Tartaric Acid
Textile Stripper
Titanium Tetrachloride
Toxaphene (Chlorinated Camphene)

Stauffer, not unlike other chemical manufacturers, is doing its utmost to keep up with the unprecedented demand for its products. Stauffer's 28 plants are working day and night to up production of its basic chemicals for industry.

Stauffer CHEMICALS SINCE 1885

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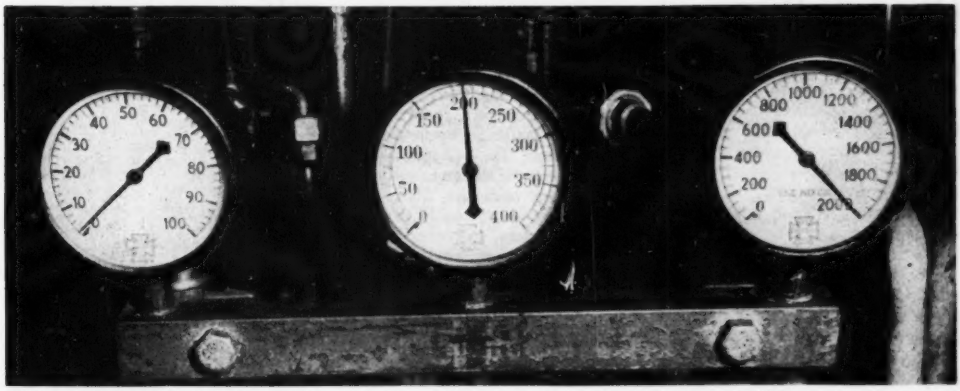
636 California Street, San Francisco 8, Cal. • 424 Ohio Bldg., Akron 8, Ohio
Apopka, Florida — North Portland, Oregon — Houston 2, Texas — Weslaco, Texas



DIALS SIGNIFY three phases in acetylene technology. First was atmospheric pressure in synthesis of acetaldehyde; second was "Reppe-Chemie," where 150-200 psi is used; latest is GAF's work at 2,000 psi or higher.

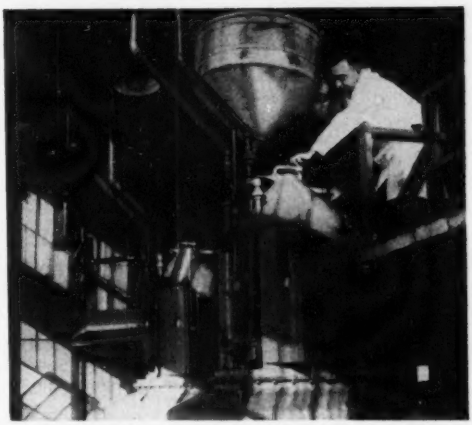
Three Steps Up

Acetylene technology steps into a third phase as General Aniline & Film Corp.'s researchers at Easton, Pa., carry out syntheses at the unheard-of (for acetylene) pressure of 3,000 pounds per square inch.

Culminating long-time development, a semi-commercial plant at Grasselli, N.J., is already using intermediate pressure (250 psi) in the synthesis of vinyl ethers and butynediol.

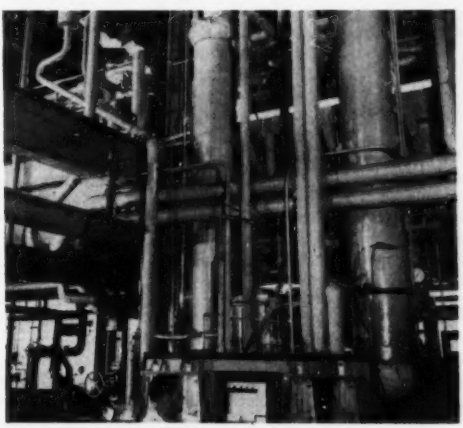
First work with acetylene was at atmospheric or slightly higher pressure; attempts to use even 50 or 100 psi invariably resulted in explosion. Not until the '30s did the German chemist, Reppe, succeed in using higher pressure—by such precautions as eliminating sharp corners in piping, using small-bore tubing and proper equipment design.

General Aniline acquired rights under Reppe's U.S. patents before World War II, extending and improving the techniques to the point where higher-than-Reppe pressures are practical. Not only can reactions be carried out that don't go at lower pressures, but often the smaller-size equipment means lower capital investment.



CALCIUM CARBIDE is current acetylene source, but large-scale plants will probably crack natural gas.

EVEN AT 100 psi it's advisable to carry out acetylene reactions behind steel and concrete barricades.

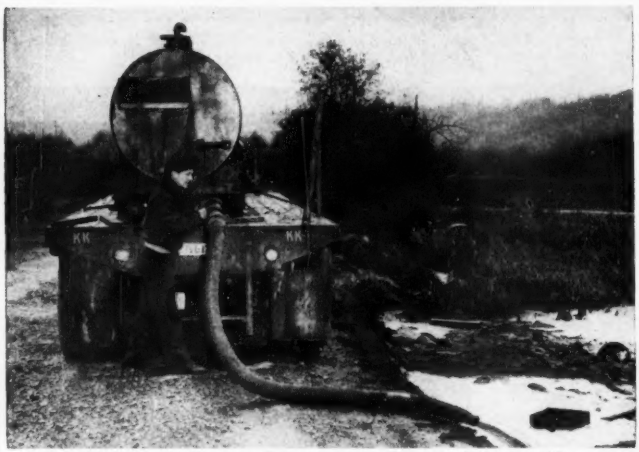


REACTION PRODUCTS (vinyl ethers and butynediol here) are purified by distillation at GAF's pilot plant.

Cyanide Disposal

Waste disposal problems are giving plenty of industrialists headaches these days, but few have to face up to a tougher problem than the one confronting Boeing Airplane Co. Cyanides are that company's bugbear; oxidation to cyanates, with a comparatively simple installation, the solution.

Boeing, situated on the Duwamish river several miles upstream from Puget Sound, is in a ticklish spot. The river is a prime spawning ground for salmon and dumping of cyanide effluent would rouse the ire of the State Conservation Board and other agencies concerned with the preservation of the fishing industry.



DUMPING WASTE: One of three answers for one of three problems.

However, with airframe output pushing along on a three-shift basis, larger quantities of cyanide are scheduled for disposal. That's why, currently, Boeing is paying a lot of attention to probing ways and means of controlling these highly toxic wastes.

Source: The Boeing cyanides come mainly from carburized or plated metal rinses and, intermittently, from the residue which has to be removed from carburizing furnaces. These insolution cyanides are converted to the less poisonous cyanates* by treatment with calcium hypochlorite. (Chlorine would be a cheaper reagent but more difficult to handle.)

The cyanate solution, kept between a pH of 6 and 8, is diluted to a maximum concentration of one part per million before it is dumped.

Equipment used: The main facilities used for the cyanide conversion are two wooden vats (3,000 gals. each (fed by gravity from the rinse tanks. A stainless-steel pump (220 gpm) circulates the cyanide-hypochlorite during the 30-minute treating period. Subsequently, about a third of the reaction mixture is pumped to the dilution basin, the balance is recirculated to keep the sludge in suspension.

Solid toxic materials, which are essentially carburizing salts from heat treating furnaces, and other high concentration solutions, cannot be practically handled by the hypochlorite unit. They are sealed in leakproof containers, dumped into the sea a 100 miles off the Continental Shelf—by a working agreement Boeing has with the American Mail Line.

Nontoxic wastes, on the other hand, are simply hauled to the municipal dump.

The entire Boeing set-up, incidentally, cost $16,000 to install. Operating expense: $67 per shift for a single attendant, chemicals, power, and other direct charges.

Future plans: The procedures now being employed are not regarded by Boeing as the final answer to its waste disposal problems. Also under experimentation: ion exchange and ozone treatments.

* Cyanates are only about one-thausandth as toxic as cyanides.

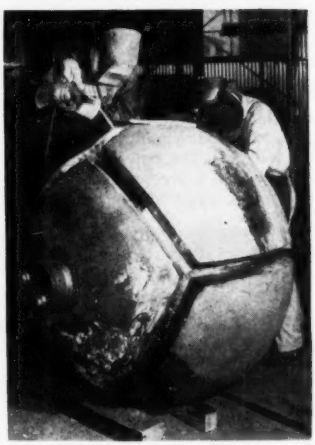
•

"Packaged" deionizing units for treating 12 to 1,000 gallons of water per hour are now available from Illinois Water Treatment Co. The series includes six sizes of mixed-bed exchangers, which will produce water containing less than 1 ppm dissolved solids, less than 0.02 ppm silica.

Up and Down

HANDLING heavy equipment in the laboratory is made easier by Fisher Scientific Co.'s "Lab-Lift". In this device the platform supporting the heavy reaction vessel or other equipment can be adjusted, by turning a screw support, to any point from 12" to 18½" above the work bench.

"Nitro-Sphere"



TO STORE liquid nitrogen under pressure for experiments on rocket-propelled aircraft, six stainless-steel plates have been welded into a sphere which can withstand a pressure of 5,500 pounds per square inch at —340 F. Fabricated of 3¹⁄₁₆" plates by Research Welding & Eng'r. Co., the "Nitro-Sphere" is 54" in diameter and produces gaseous nitrogen at any pressure up to 10,000 psi by controlling boil-off of liquid nitrogen.

Amortization Scramble

Some of the confusion regarding amortization of chemical plants is dispelled by recent NPA directive.

Cases of full amortization (within 5 years) will be rare, unless usefulness of plants vanishes with end of emergency.

CIW examines operations of NPA's Facilities and Construction bureau and processing of Certificates of Necessity.

Last week, Defense Production Chief William Harrison issued that office's first clear-cut policy directive on rapid amortization of new facilities. The order indicates a general clamping down on full amortization within 5 years. But it does help to answer the question raised by many chemical firms—why some plants are granted quick write-offs and some refused.

The only plants eligible for 100% depreciation in 5 years are those whose usefulness will end with the termination of the emergency. But scaled down percentages are allowed depending on a number of variables. Among the factors taken into consideration are the location of the new facility, normal depreciation rates, and the possibility of conversion to peace time use.

In the chemical process industry, some petrochemical plants are eligible for 100% rapid amortization. On the other hand, plants for producing high tenacity rayons, and certain types of paper mills can amortize only 50% of total expansion costs in 5 years.

Expansion incentives: The entire Washington picture of bureaus responsible for expansion incentives is still somewhat muddled. In an effort to clear up some of confusion, CHEMICAL INDUSTRIES WEEK has examined the functions and operations of the different divisions.

All NPA functions relating to the building of new facilities and defense construction come under the jurisdiction of the agency's Facilities and Construction bureau. Key man in the bureau is Frank R. Creedon, assistant administrator.

Creedon's bureau contains a loan division. The division can authorize loans to companies who have contracted to supply articles to the military. The condition for receiving a loan is that the item cannot be obtained except through expanded facilities.

The Industrial Plants Division, in Creedon's bureau, carries the process one step further. Under the guidance of a facilities clearance board, the division determines the urgency of the proposed project. If the project is sufficiently urgent, the division makes sure that it gets the necessary ratings for delivery of materials and equipment.

Certificates of Necessity: The steps that a chemical firm must take to obtain a Certificate of Necessity are actually quite simple. The hardship comes in attempting to trace the devious route of the application and finding out its exact status.

The standard application is a 6-page form with 2 summary sheets (known as NSRB Form 104). The blank forms can be obtained at any Dpartment of Commerce field office or from the Defense Production Administration in Washington. DPA acknowledges receipt of the application, but from the time of receipt until the final decision, the applicant has no way of knowing the status of the application.

Actually, DPA refers the form to that agency or officers in the government which, under the Defense Production Act of 1950, has specific responsibility for dealing with that type of production. For chemical production, the application goes to the Tax Amortization Division in Creedon's bureau.

The tax division then makes a report recommending specific action to DPA. The regulations say that the report must be based on a thorough examination and investigation by the agency.

After receiving NPA's recommendations, DPA makes its decision. If a Certificate of Necessity is granted, a copy is sent to the Commissioner of Internal Revenue for evidence on tax reduction.

DPA's action does not mean that it certifies the accuracy of the cost of the facility, however. The firm still has to establish to the satisfaction of the commissioner all facts concerning identity of facilities, costs, and dates.

FRANK R. CREEDON: His bureau investigates, DPA issues certificates.

The certificate, issued under Section 124-A of the Internal Revenue Code, certifies that the facilities covered are in the interest of national defense. Up to February 23rd, DPA has received 3,319 applications, granted 447 certificates, refused 63.

Refusals have fallen into 2 broad categories. In the first are those firms desiring to expand facilities when there is no foreseeable shortage in the field. The other class is composed of firms producing goods not identified with defense production.

Pollution Funds

This week, the U.S. Public Health Service will start doling out $1 million among the states and interstate agencies. Funds will be used to further studies on the prevention and control of water pollution caused by industrial wastes.

The states will receive the lion's share of the grant—$778,313. Other recipients of funds will be 7 interstate agencies—$88,907, and Alaska, Hawaii, and Puerto Rico—$37,000.

In addition to the general grant to the states, five states will receive funds to study industrial waste problems of regional or national importance.

Minnesota will get $4,000 to study the treatment of wastes from beet sugar refinery, and Texas will get $14,000 to investigate methods of treating citrus wastes. The other 3 states getting special funds: Massachusetts—$12,500 for developing methods for treating wool scouring wastes; Washington—$10,000 to study various

industrial waste problems, particularly effect of pulp and paper waste products on aquatic life; and Ohio—$11,040 to study the effect of toxic metal plating wastes on biological sewerage treatment.

The million dollar grant will be the second one for the USPHS. The Federal Pollution Act of 1948 authorized an appropriation to the Federal Security Agency (chief agency in the USPHS) of $1 million for each of the five fiscal years from July, 1948 to June 30, 1953. However, Congress did not appropriate the money until late last year.

Utility Player

The practice of putting chemical men into tough Washington defense posts continued this week as NPA Administrator Manly Fleischmann appointed Thomas S. Nichols as his special assistant. Nichols, president and chairman of the board of the Mathieson Chemical Corporation is taking an indefinite leave of absence from his company to handle his new governmental duties.

Nichols' new post is of the top level variety. No specific duties are enumerated for him. But NPA officials say he will do "whatever needs to be done" to help NPA Administrator Fleischmann. And it's no secret that the latter is just at the beginning of a general recruiting campaign for high-calibre men. The NPA operation is growing steadily and a Controlled Materials Plan is scheduled to go into operation in a little over three months.

Nichols' appointment also offers a partial solution to the problem of having one or two understudies on hand for the Deputy Administrator's job (NPA) which is now held by Glen Ireland, on leave as v.p. of the Pacific Telephone and Telegraph Company. Now, if anything were to happen to the either Fleischmann or Ireland, Nichols would be next in line to take over.

T. NICHOLS: Can play any position.

Washington doings are no new experience for Nichols. During World War II he was special assistant to the Director of the WPB Chemical Division and a member of the Harriman mission to London. This experience, plus that gained in the chemical industry during his career with Du Pont, Prior Chemical, and Mathieson, makes 42-year old Nichols a true "utility" player for the NPA.

Illegal Alcohol

The recent hearings before the Kefauver Senate Crime Committee, held in Washington D.C., focused the nation's attention on the growth and extent of illegal (non-taxpaying) distilling in this country. But to legal distillers (taxpaying) it was not news . . . just an old story brought up to date.

This week a survey of the activities of the illegal distillers was being widely read by their legal competitors. The survey, a special study prepared by Licensed Beverages Industries Inc., revealed the startling fact that the daily capacity of the illegal still seized by law enforcement officers during one year (1949) exceeded the daily total capacity of legal distillers by 120,000 gallons.

Specifically, about 52 illegal stills were seized daily during 1949. The average capacity of the seized stills was about 28 gallons per still per day. But several southern states reported that the capacities of the stills their authorities seized ranged as high as 100-200 gallons. And in the northeastern states quite a few seized stills were reported to have capacities ranging as high as 1000 gallons per day.

Spokesmen for the liquor industry and government officials are genuinely alarmed about the situation. The increased rate of seizures, they claim, shows that the illegal distilling "indutry" is growing at a rapid rate. "Today", they say, "illegal distilling is Big Business, no longer limited to the manufacture of moonshine."

The major point of concern for both government and the legal distiller is that the illegal distiller does not pay any taxes. This puts the legal distiller in a bad competitive position and deprives the federal government of a husky source of revenue. On a tax basis alone the 19,000 illegal stills seized during 1949 were depriving Federal and state treasuries of an estimated $5.5 million a day.

CLARENCE EVANS: Tennessee commissioner calls moonshine "big business".

Many legal distillers attribute the growth of their illegal counterparts to the high real and prospective taxes on alcoholic beverages. They warn that any further tax increases may bring back a "Golden Era" for the bootlegger.

Fertilizer Feud

Pressure is being brought to bear on Defense Mobilizer Wilson to have agriculture declared a defense industry. Motive of the move is to enable agriculture to get a share of sulfur, under the pending allocation order.

Latest to join the ranks of boosters for agriculture is Senator Allen J. Ellender (D. La.), chairman of the Senate Committee of Agriculture and Forestry.

Ellender endorses the recommendations made by the House Agriculture Sub-Committee (House counterpart of Ellender's Senate committee). After 4 days of rushed hearings, the house group came out vigorously in favor of granting agriculture a defense status.

Step-child: In a letter to Wilson last week, Ellender said agriculture is not getting recognition in the planning for allocation of fertilizer materials—especially sulfur and sulfuric acid. He said that agriculture should be consulted as a prime defense industry.

The Senator from Louisiana put in a strong bid to have agriculture sit in on deliberations which are expected to result in an NPA allocation of sulfur by the end of this month.

Columbia Chemicals

A DEPENDABLE NAME IN

For over half a century, Columbia has been a leader in the production of alkalies and related chemicals. And, within the last five years, Columbia has expanded its operations to include a variety of organic chemicals.

Columbia's long-established reputation comes from many things. It comes from Columbia's record as a volume producer of quality chemicals . . . from the expert technical service Columbia renders to its customers . . . and from Columbia's many improvements and innovations in chemical manufacturing, shipping and handling.

The customers of Columbia know they can always count on top quality chemicals and technical assistance that may lead to savings in shipping and storage space, time, labor and money.

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- CAUSTIC SODA
- LIQUID CHLORINE
- SODIUM BICARBONATE
- CALCIUM CHLORIDE
- PHOSFLAKE
- CLEANER AND CLEANSER
- S. P. FLAKE
- SODA BRIQUETTES
- CAUSTIC ASH
- MODIFIED SODAS
- CALCENE T
- SILENE EF
- HI-SIL
- MONO-CHLOROBENZENE
- ORTHO-DICHLOROBENZENE
- PARA-DICHLOROBENZENE
- BENZENE HEXACHLORIDE
- MURIATIC ACID
- PITTCHLOR
- PACIFIC CRYSTALS
- BORAX
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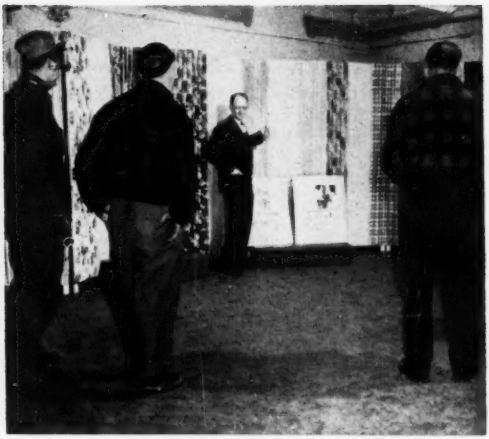
PPG

PITTSBURGH PLATE GLASS COMPANY

"A SNOW WHITE POWDER that gets in your hair and teeth" was the opinion many plant workers had of Marvinol before exhibit.



THIS IMPRESSION CHANGED as production men saw how "their" product formed the basis of many everyday items of utility.

U. S. Rubber to Plant Workers

A pride in the beauty or utility of the product he makes is the characteristic hallmark of the happy and productive employee. But the chemical worker often has a hard time achieving this satisfaction since the products of his labors are usually liquids, powders or "gunks" for "vague" uses.

This week, the management of the Naugatuck Chemical Division of the U. S. Rubber Company is busy evaluating the results of its latest effort to show production personnel where and how products are used after they leave the plant gate. Specifically, the item being considered is the portable "Your Product in Use" exhibit which was recently shown to the 300 employees of the company's Marvinol (polyvinyl chloride) plant at Painesville, Ohio.

"TRY ON A FEW POUNDS FOR SIZE," says shift supervisor to plant carpenter, as he models raincoat made from "his product."

THREE RIGGERS, used to moving heavy things around plant, see how "their" product contributes to lightness in luggage.

FOREMEN toured the exhibit after hours and examined many things, from ice buckets to dishracks, made out of Marvinol.

"This Is Your Product In Use"

Over 85% of the plant staff (attendance voluntary) saw the exhibit. It was a one day affair that opened at 11 o'clock in the morning in one of the buildings of the plant. And it remained open until 4 P.M. to catch the workers reporting for the late shift. As would be expected, products made from Marvinol got top billing in the exhibit. But plastic materials made at other plants of the division also came in for their share of attention.

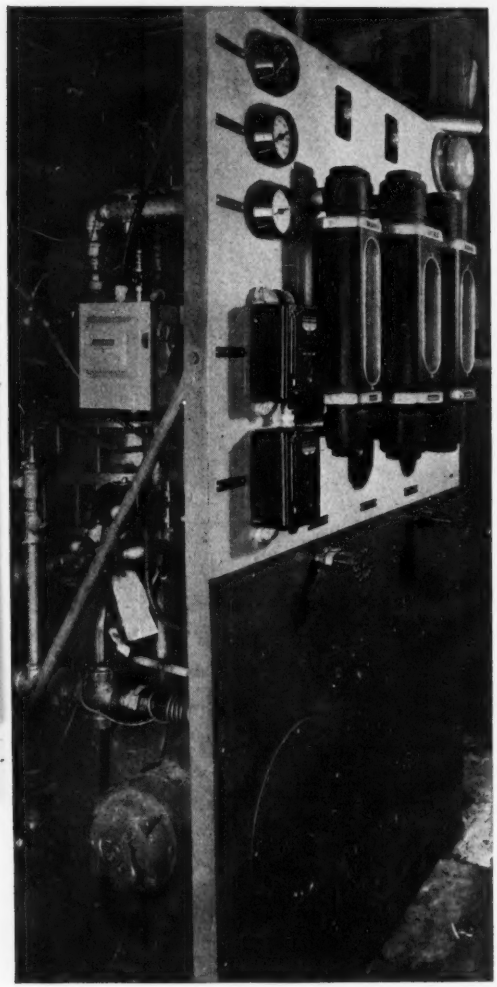
Actually, the exhibit was first assembled for presentation to the executive committee of the company. But production officials seized upon it as just the thing to show plant workers their part in the production of useful "everyday" items. They were right.

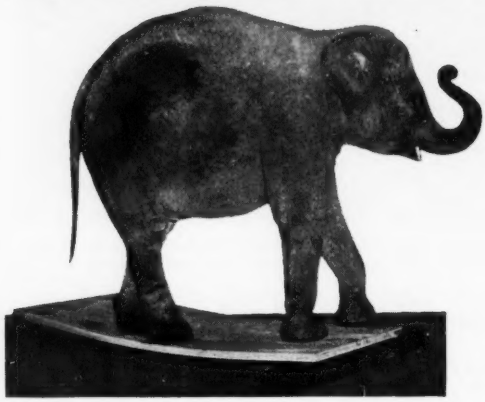
YARD MECHANIC EXAMINES YARD GOODS made out of the "stuff" he helped to produce, and last saw in a 50 pound bag.

ON DAYS OFF, these Painesville plant men may use fishing rods partially made out of Vibrin, another product of company.

UPHOLSTERY, made from "our" plastic, is tried out by operator of unit that generates acetylene, raw material for Marvinol.

Life ...on the



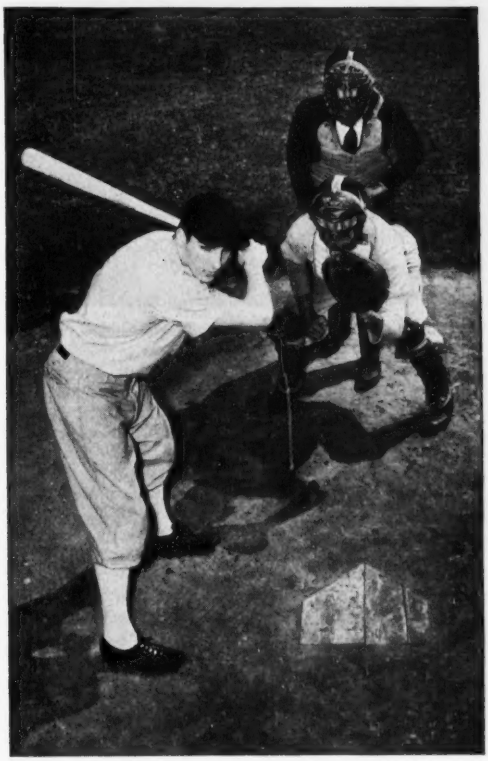


PROOF ON THE HOOF—over one ton of elephant recently put Cyanamid's MELURAC® Resin 300 to the test. Jumbo simply stood on a MELURAC bonded plywood door placed between two blocks. Slowly the panels bent . . . then steadied as the bonding held firm. Moral: even though elephants don't walk on your products, you can't beat MELURAC for a strong, sure bond.

USING LITTLE SPACE INSTEAD OF BIG SPACE is but one of the advantages of Cyanamid's new Automatic Emulsifier that will *continuously* emulsify liquid rosin sizes during paper making. Occupying only a little more space than a common office desk, this new unit cuts labor costs, closely controls size-solids concentrations and eliminates the need for several large storage tanks. Use the coupon for complete details.

TOMORROW'S HIGHWAY—that's a two word definition of the famous Pennsylvania Turnpike now being extended eastward to the outskirts of Philadelphia, westward to the Ohio border. Cyanamid explosives telescoped years into months when they helped move mountains of earth and rock to lay the way open for this modern highway. For more information about AMERICAN Explosives and blasting accessories made by Cyanamid, mail the coupon.

Chemical Newsfront



LEATHER'S KING of the diamond for everything from ball to catcher's mitt as another season starts and the cry, "Play ball" echoes again through the big league parks. Among the mainstays in producing top quality leather for sporting goods are Cyanamid's CUTRILIN® Bating Materials. Tanners use these pancreatic enzyme preparations to assure uniform bating action and the production of leather with fine grain, tight break, and full flanks.

NEW PRODUCT NEWS
CYANAMID'S ACRYLIC POLYMERS

What are they?

Modified sodium polyacrylates of varying viscosities.

What are their properties?

Possess interesting thickening, stabilizing, and film forming characteristics. Apparently not affected by common molds and bacteria. Stable under storage at high temperatures. Water soluble anionic colloids, available as straw colored aqueous solutions.

Suggested uses

Adhesives, binders, detergents, thickening agents, film former, protective colloids, suspending agents, textile sizes.

Data Sheet

Fill out and mail coupon.

American Cyanamid Company CI3-51
30 Rockefeller Plaza, New York 20, New York

Please send literature or further data on items checked:

- ☐ MELURAC Resin 300
- ☐ CUTRILIN Bating Materials
- ☐ Acrylic Polymers
- ☐ AMERICAN Explosives
- ☐ Automatic Emulsifier for Liquid Rosin Size

Name..... *Position*.....

Company.....

Address.....

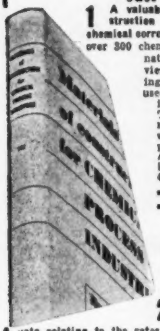
State.....

In Canada: North American Cyanamid Limited
Toronto and Montreal

AMERICAN Cyanamid COMPANY
30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

MATERIALS OF CONSTRUCTION FOR CHEMICAL PROCESS INDUSTRIES

Just Out!



1 **A valuable guide to selecting construction materials which resist chemical corrosion most effectively.** Covers over 300 chemicals and chemical combinations—describing them, then viewing the corrosive-resisting qualities of the materials used in the production, handling, and packaging of each. The chemicals covered represent the majority of cases where corrosion is an important factor. **By James A. Lee, Southwestern Editor, Chemical Engineering. 468 pages, 111 illus., $6.50**

CHEMICAL KINETICS

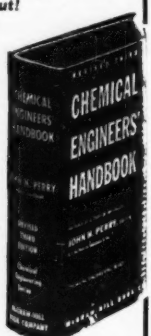
2 **Provides important facts, theories, methods, and data relating to the rates with which chemical reactions occur.** It discusses advances in theory of reaction rates — photo chemistry — radio-chemistry — catalysis — oxidation — polymerization — and biological kinetics. Covers elementary gas-phase reactions, reactions in solution, organic and inorganic reactions, etc., etc. **By Keith J. Laidler, Assoc. Prof. of Chemistry, The Catholic Univ. of America. 408 pages, 44 illus., $6.00**

ANALYTICAL CHEMISTRY OF THE MANHATTAN PROJECT

(National Nuclear Energy Series)

Just Out!

3 **A compilation of related developments from all the Project research laboratories that performed similar studies.** Covers the determination of, and analysis of important materials such as uranium. **Editor-in-Chief, Clement J. Rodden, Director, New Brunswick Lab., U.S. Atomic Energy Commission. 748 pages, 48 illus., $6.75**



CHEMICAL ENGINEERS' HANDBOOK

4 **Presents a fresh coverage of modern chemical engineering fundamentals and practice—30 big sections, larger pages, more than 140 contributors.** Takes up recent developments, new procedures, new equipment. Gives quick answers to all problems; thousands of tables, formulas and diagrams. Brings you up-to-date on unit processes, design and practice. **John H. Perry, Editor, Technical Investigator, E. I. duPont de Nemours & Co. 1942 pages, $15.00**

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IRVING LEE: Speech expert points to script, colleagues listen.

Safety First

"Speaking of Safety" is the title of the training series recently introduced by the National Safety Council. The 6 film series is designed for supervisory personnel who are responsible for presenting talks or conducting meetings on safety. It presents an earthy, entertaining course of instruction on the principles of public speaking.

Author of the series is Dr. Irving J. Lee, speech expert from Northwestern University. The unpedantic professor based the series on a fundamental concept . . . the best material in the world can be wasted by faulty presentation.

Each film in the series is devoted to a common problem confronting the would-be orator. The first one—"The Power of Speech"—explains the often elusive distinction between a formal and informal speech and discusses the speech from the angle of both the audience and speaker.

The second film—"Butterflies in Your Stomach"—gives some common causes of stage fright and presents methods of overcoming it. Film No. 3—"The Key to Good Speaking"—outlines the various methods of preparing a speech.

The fourth of the series—"On Your Feet"—discusses some knotty problems, like what-to-do-with-your-hands. Lee also demonstrates how and when to move around while talking. The fifth film—"Now You're Talking"—covers the vocabulary and phrasing of the talk.

The final film—"Ring the Bell"—shows how to put the talk across. Lee advocates a liberal sprinkling of cartoons, graphs, and other visual aids to arouse interest. Each film takes about 13 minutes to run.

Chemical managements are eyeing the new series as a means of teaching foremen how to perform an important part of their job: teaching safety.

EXPANSION . . . . . .

Hanford Works: An additional outlay of $25 million will go toward the expansion program at AEC's Hanford Works at Richland, Wash. Under the original schedule, $180 million would be spent, work would begin to taper off by the end of this year. Plans now call for $205 million, work will continue until mid-1952.

•

Monsanto: Capacity of the new styrene plant (completed in August, 1950) will be increased appreciably. Plans call for doubling production, but officials of the company say that goal may not be reached because of the tight supply of styrene raw materials.

•

Koppers: The company has purchased a large tract of land in Port Arthur, Texas for a multi-million dollar ethyl benzene plant. Ethylene will be supplied from the new Gulf Oil plant in the area. And the ethyl benzene will supply the Kobuta styrene plant. No official figures are available on the cost of the project but preliminary estimates say it will involve an

expenditure of $12 million.

Company officials say the new plant in Port Arthur coupled with the expansion at Kobuta will boost styrene output 33%. New facilities at Kobuta include equipment to increase production of polystyrene (to be increased 25%) and a new warehouse.

FOREIGN . . . . . .

Brazil: An emergency shipment of 15,000 tons of sulfur has been promised to the Brazilian Embassy in Washington. The import is expected to prevent the crisis the country faced in its chemical process industry. The U.S. government is still studying the request of Brazil for an upward revision of the quota recently assigned.

Brazil's current needs are estimated at 70,000 tons a year. The U.S. has allocated 44,000 tons. The emergency shipment is being applied against the quota, at least for the time being.

•

India: More than half of India's supplies of ammonia sulfate for fertilizer were imported from Russia, according to the recent figures released by New Delhi.

Of the 170,800 total tons imported Russia supplied 87,000 tons. Other big suppliers were the U.S., United Kingdom, and Belgium. Domestic production is estimated at 47,000 tons, demands 1 million.

The new government factory at Sindri in Bihar is expected to produce 350,000 tons a year when completed. The project is not proceeding as rapidly as originally expected, however, and India's imports of ammonium sulfate are likely to remain high for many years.

Government Needs

Raritan Arsenal, Metuchen, N.J.: 12,200 gals. of hydraulic Brake fluid (on invitation No. 51-381—until March 26).

•

U.S. Bureau of Mines, Drawer B, Boulder City, Nevada: 145 tons of titanium tetrachloride (on invitation No. FSW/9—until March 28).

•

Armed Services Medical Procurement Agency, Brooklyn, N.Y. 9,152 drums of disinfectant-germicide and fungicide solution (on invitation No. 1111—until Mar. 27).

Gov't Contract Awards

Cole Laboratories, Inc.: 180,000 lbs. of hydrochloric acid (muriatic, Spec. O-A-86)—$29,040.

•

Du Pont: 240,000 lbs. of hydrochloric acid (muriatic, Spec. O-A-86)—$29,172.

•

Linde: 28 million cu. ft. of liquid oxygen, 99.5% purity—$105,200.

•

American Marietta Co.: 107,480 gals. of cellulose nitrate lacquer—$234,965.

•

Randolph Products Co.: 16,131 gals. of cellulose nitrate lacquer—$38,352.

•

Spazier Soap & Chemical Co.: 600,000 lbs. of powdered fine boiler compound—$99,000.

•

Industrial Oil Products Corp.: 2,400 gals. of fish oil—$47,520.

•

Diamond Alkali: 327,600 lbs. of chlorinated paraffin, type 1—$52,416.

NAVY PURCHASING OFFICE, 111 E. 16 STREET, NEW YORK 3, N. Y., WILL RECEIVE BIDS FOR THE FOLLOWING:

Bids Close:	Inv. No.	Quantity	Item
Mar. 27	8493	15,000 lbs.	painted surface cleaner
28	8497	30,600 gals.	grease cleaning compound
28	8540	108,000 ea.	toilet bowl cleaning compound
29	8512	90,000 lbs.	hydrochloric acid
30	8518	11,000 lbs.	borax
Apr. 2	8457	3,600 lbs.	cuprous (copper) cyanide
2	8488	6,000 ea.	fire extinguisher charges
3	8529	6,400 lbs.	storage battery sealing compound
3	8494	3,900 lbs.	ammonium chloride
4	8507	7,640 bt.	ferrous sulfate
4	8498	2,592 lbs.	ammonium hydroxide
5	8501	7,980 lbs.	buffing and polishing compound
6	8485	324,000 lbs.	phosphoric acid
6	8531	130,900 lbs.	aqua ammonia
11	8486	210,576 ea.	calcium hypochlorite

How your dollars

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through

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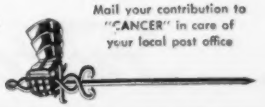
that saves lives

The American Cancer Society's program of *Public Education* stresses cancer's danger signals, to bring people to their physicians in time; *Professional Education* brings latest facts to doctors, nurses, dentists. Your contribution to the Society also strikes back at cancer through *Research* and *Service* to the cancer patient.

AMERICAN CANCER SOCIETY



THE BAG THAT'S ALWAYS *ON GUARD*

Your product is never "A.W.O.L." when packed in a Fulton W.P.P.L. (waterproof paper lined) bag. The tough paper or plastic lining—laminated to Cotton or Burlap with strong adhesive—is not only sift proof, but is also an efficient barrier against moisture vapor.

The chemical and fertilizer industry has found Fulton W.P.P.L. bags the ideal containers for sensitive products which require complete protection. For export or domestic shipments they have advantages over rigid containers because they are strong, flexible and easier to handle and requires less space for storage. There are important savings too in initial cost and freight.

Investigate the Fulton W.P.P.L. for your product. Saleswise, a packaging improvement is a product improvement. Address your nearest Fulton Branch for full information.

Our modern plant in New Orleans is turning out famous Fulton MULTIWALLS in larger and larger quantities. Complete satisfaction and highest praise from industry's largest users, have made Fulton Multiwalls more popular than ever before. Fulton makes the MULTIWALL Bag for your product—all types and sizes.

Fulton BAG & COTTON MILLS

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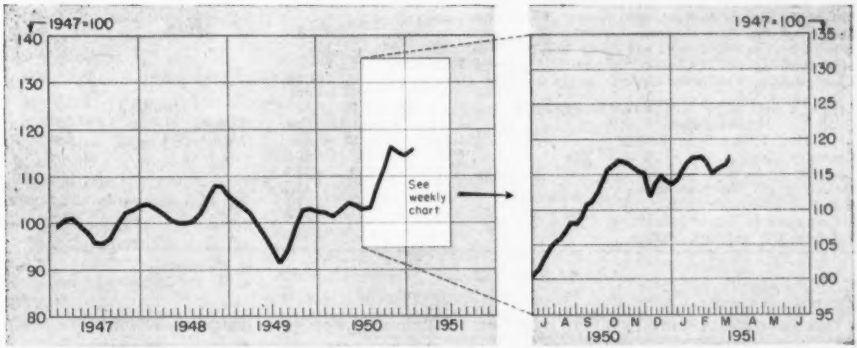
CHEMICAL MARKETS....



CHEMICAL INDUSTRIES OUTPUT INDEX—Basis: Total Man-Hours Worked in Selected Chemical Industries

Now would be a good time to brush up on World War II's M-300 general allocation order. Expected momentarily from the National Production Authority is an M-45 order incorporating the gist of its earlier counterpart with only minor modifications.

Conforming to the general trend in U.S. foreign trade, chemical exports declined and imports rose about 10% in January, 1951, compared with the previous month. Exports are still more than double imports in value, but with increased competition and higher prices on imported chemicals, the margin will further shrink during this period of stockpiling and shortages.

Government alcohol production figures for January reveal several interesting changes: Usage of ethylene for this purpose increased 85% over the corresponding figure a year ago, and 33% over the month before. Materials for other production routes remained relatively steady; only molasses showed a consumption decline—20% from a year ago, and 10% from December.

With the tremendous expansion in over-the-counter uses for penicillin, corresponding increase in production was inevitable. New plant construction by Commercial Solvents will be in operation by summer and is rated to double the company's present output.

Spot prices of chemicals at resale are sometimes a far cry from manufacturers' quotations but often give a more realistic picture of the market: DDT ranges this week from 80-84c a pound; isopropyl alcohol carries a 86-92c a gallon price tag; less carload lots of chromic acid are quoted at 54c a pound.

In versatile tonnage, chlorine bestrides almost every phase of the chemical industry. But present production doesn't nearly satisfy essential needs. NPA has therefore granted 35 certificates of necessity with rapid tax write-offs. Authorized new production amounts to 1.1 million tons—a 50% increase over present capacity.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	118.3	117.3	103.0
Bituminous Coal Production (Daily Average, 1000 Tons)	1,663.0	1,858.0	2,247.0
Steel Ingot Production (Thousand Tons)	2,021.0	2,001.0	1,821.0
Wholesale Prices—Chemicals and Allied Products (1926=100)	146.9	148.7	115.8
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	213.2	223.8	163.1
Chemical Process Industries Construction Awards (Eng. News-Record)	$2,719,000	$29,808,000	$1,123,000

MONTHLY BUSINESS INDICATORS—FOREIGN TRADE (Million Dollars)	EXPORTS			IMPORTS		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, Total	58.1	66.7	50.3	27.4	23.4	10.0
Coal Tar Products	5.4	5.9	3.6	2.9	2.8	1.7
Medicinals and Pharmaceuticals	15.2	19.2	13.8	1.5	1.6	0.4
Industrial Chemicals	8.6	9.0	7.3	11.9	11.3	1.7
Fertilizer and Fertilizer Materials	2.0	4.4	5.5	9.0	6.8	5.5
Vegetable Oils and Fats, Inedible	4.9	9.5	6.0	12.5	11.0	4.6

Among products based on sulfuric acid, copper sulfate has become one of the scarcest. Practically all carload supplies have been committed until June, although spot l.c.l. quantities are available at 12-13¢ a pound.

Should plans of the International Development Advisory Board materialize, the Administration's Point Four program will pick up new strength. A project of this scope would entail many responsibilities for U. S. chemical industry, with supplies still the No. 1 problem.

Non-ferrous metal notes: Following the recent precipitous fall, tin prices hover uneasily at the $1.34 a pound mark; smelter zinc production declined to pre-Korea levels, with new NPA restrictions in the offing; Chilean copper producers are willing to double output—if the price is notched 4¢ a pound higher.

Stepped-up requirements for styrene, phenol, and aniline will keep the benzene shortage on the chemical scene until well into 1952. At least 100 million gallons of benzene from petroleum will be needed by that time if the shortage is not to worsen. By 1955, another 100 million gallons will be needed, calling for 410 million gallons annually, more than double today's capacity.

Some chemical raw material imports from South America have lately shown signs of price weakening: casein, menthol, and carnauba wax are notable examples.

Look for early clarification of chemical import and export price ceilings and regulations which have hobbled overseas commerce since the January 26 issuing date. At least some of the problems will be ironed out as OPS Chief DiSalle meets with trade associations in New York this week.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending March 19, 1951

	Change	New Price		Change	New Price
UP					
Candelilla Wax, crude	$ .02	$ .72	Quicksilver, 76 lb. flask	$3.00	$217.00
Egg Albumen, flake	.12	2.07	Spearmint Oil, USP	.05	5.75
Linseed Oil, raw, tankcar	.005	.23			
DOWN					
Carnauba Wax, No. 1 Yellow	$ .01	$1.29	Copra, c.i.f., Pac. port/ton	$15.00	$270.00
Casein, imported, acid-precip.	.005	.385	Menthol, nat., USP	.10	13.05
Cedarwood Oil	.05	.60	Ouricury Wax	.05	1.05
Cocoa Butter	.02	.785	Shellac, refined	.005	.675
Coconut Oil, crude, Pac. ports	.01	.205	Tin	.05	1.34

All prices per lb. unless quantity is stated

BOOKS . . . . . .

The Phase Rule and Heterogeneous Equilibrium, by John E. Ricci. D. Van Nostrand Co., Inc., New York, N. Y. xi + 505 pp., $12.

The stated purpose of this book is the presenting of a systematic study of the meaning and application of the Phase Rule which may be general enough to be used as reference for almost any application of the principles. The author thereby provides information, basic in dealing with the problems of chemical investigation – the identification and characterization of substances and the study of their interactions.

In order to attain generality in point of view and the simplest exposition, the author starts with miscibility in all states as the fundamentally simple relation both in binary and ternary systems. He then goes on to explain the complications brought about by the occurrence of a miscibility gap in a particular state. The author has emphasized the interconnection between the familiar diagrams of systems of various orders, or numbers of components; in doing so, he points out and utilizes the basic identity of typical diagrams for a variety of relations wherever possible. Over 500 figures are made use of to make the principles clearer, with examples of the units used, the methods of plotting and graphical relations.

Theoretical Organic Chemistry, Part II, Vol. 35, by W. Hueckel, J. Goubeau, G. Scheibe and G. V. Schulz. The O. W. Leibiger Research Laboratories, Inc., Petersburg, N. Y.; 221 pp., $5.30.

One of the series entitled, "The American Fiat Review of German Science, 1939-1946," this volume along with 87 others presents a complete and concise account of research and advances of a fundamental scientific nature made by German scientists during the war years. All volumes were published and prepared in cooperation with the Office of Technical Services of the U. S. Department of Commerce.

As a direct continuation of Vol. 34 on the same subject, Part II is also based on electronic concepts and other up-to-date theories. The mass-effect law is discussed along with other physico-chemical aspects of importance to reactions between molecules of all sizes, including heterocyclic and macromolecules. Other topics covered are surface tension and viscosity, constitution and color, absorption spectra and Raman spectra. Spectra and configuration of organic molecules are applied to testing methods for polymerization reactions, polymerization mechanism and kinetics.

Mechanical Engineers' Handbook, 5th Edition, edited by Lionel S. Marks. McGraw-Hill Book Co., New York, N. Y.; 2,236 pp., $15.

Revised 5th edition, compiled by over 100 engineers, each a specialist in his field, covers every branch of mechanical engineering. In addition to treating fundamental theory, this technical volume supplies available data on the properties of the materials used by engineers and on the performance and characteristics of those processes and structures in which they are interested.

Containing more than 12,000 entries, this edition is divided in 16 major sections, all of which provide brief descriptions, formulas, methods, tables and diagrams to aid the engineer in solving problems of design, practice or investigation. Revisions and new subject matter appear in reference to theory, processes, materials and power.

Physics in Chemical Industry, by R. C. L. Bosworth. The Macmillan Co., New York, N. Y.; xix+928 pp., $12.75.

This text develops those branches of physics which are fundamentally involved in many of the operations concerned in industrial chemistry, with the stress being placed on the principles of the various instruments and operations rather than on the details. From the chemist's point of view, the author covers the topics of mathematics, mechanics, properties of matter, thermodynamics, kinetic theory and other aspects of applied physics. The subject matter is divided into four parts, each section beginning with fundamental principles and going on to the various factors from there. As a reference book for both the industrial chemist and chemical engineer, this volume furnishes basic information related to technological operations in chemical industry and in doing so indicates the need for the closer interrelationship between science and industry.

Beeswax, by Huber H. Root. The Chemical Publishing Co., Inc., New York, N.Y.; 154 pp., $4.75.

Drawing upon his long experience with bees and beeswax, the author explains the origin of beeswax and its nature, lists the applications for which it is more suitable than mineral or vegetable waxes, and discusses its future possibilities. Every aspect of the production, purification, testing and application of beeswax is covered.

After an introduction dealing with the discovery and origin of beeswax, the author goes on to explain the method of its preparation by bees, the best procedures for extracting beeswax from combs or cappings, and the apparatus needed for the manufacture of wax. There is a chapter on standard testing methods and another on bleaching processes, both natural and chemical. In discussing the uses of beeswax, the author describes the principal procedures followed and lists numerous formulas especially for the manufacture of cosmetics. Bibliographies appear for each chapter.

The Polarographic Method of Analysis, by Otto H. Müller. Chemical Education Publishing Co., Easton, Pa. xii + 209 pp., $3.50.

Revised and expanded edition presenting the fundamentals of polarography in a form which can be used by students in physical chemistry as well as in advanced courses of analytical chemistry. Before discussing polarometry, the author reviews electro-analytical methods, essential apparatus used, fundamentals of quantitative analysis and qualitative analysis with sections on kinetic and catalytic currents. In treating the subject of polarometry, the author also gives a brief description of some of the recent developments in the field such as differential, derivative, and oscillographic polarography. The last two chapters give general, organic, and inorganic applications, plus suggestions for practical polarography with special attention given to the characterization and selection of capillaries for the electrode.

Briefly Listed

STATISTICAL ENGINEERING IN THE CHEMICAL PROCESS INDUSTRIES by James R. Thomen, 48-p. monograph, the first of a series containing collected abstracts of articles discussing the application of statistical methodology and statistical engineering of chemical experiment, process, and product in chemical industries. Chemonomics, Inc., 400 Madison Ave., New York 17, N. Y. for $2.

LIQUID VAPOR EQUILIBRIA IN THE BENZENE–CARBON TETRACHLORIDE SYSTEM, by I. N. Bushmakin and E. D. Voyeikova, English translation of article from "Journal of General Chemistry" of the U. S. S. R., Sept., 1949 contains vapor equilibria data and descriptions of device and new method used for determining liquid-vapor equilibria. Can be procured from Consultants Bureau, 152 West 42nd St., New York 18, N. Y. at $5. per copy.

SEARCHLIGHT SECTION

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NEW ADVERTISEMENTS received by 10 A. M. March 28th at the New York Office, 330 W. 42nd St., New York 18, N. Y., will appear in the April 7th issue subject to limitations of space available

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FMC EQUIPMENT HEADLINERS

Selected from our Latest Bulletin

W.&P. Type 150 Gal. Jacketed Double Arm Mixers

3 Buhrstone Lined Pebble Mills

Stainless Tumbling Batch Mixers, 23 cu. ft.

Stokes Rotary "DD" Tablet Press

Hardinge Conical Ball Mills State Size Required

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NEW PRODUCTS

Polyvinyl Acetate Emulsion 17A

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- Buffing compounds, ethomid HT 160 ..... 10b
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- Dichloroacetaldehyde I
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- Fatty acids
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- For the manufacturer of cosmetics and toiletries B21
- Gilsonite 1a
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- Industrial and agricultural 26
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- Insecticide concentrates T25
- Isopropyl amine 18
- Lithium compounds B25
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- Monobromated camphor T21c
- Monohydrate of soda T24b
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  - Azeotropic distillation 14b
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  - Selective solvent extraction 14a
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- Pitch compounds 1b
- Propyl gallate T21d
- Resins L2c
- Resins, 300, melurac 34-35a
- Rosins L2d
- Sal soda T24c
- Sodium hydrosulphite R17c
- Solvents L2b
- Solvents
  - Benzol L16a
  - Hi-flash L16d
  - Toluol L16b
  - Xylol L16c
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READER SERVICE COUPON

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NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

CITY & STATE _____

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BOOKLETS.....

Chemicals

Industrial Chemicals

32-p. catalog, 1951 edition giving brief descriptions, specifications, properties, and typical uses of all of the fifty-five industrial chemicals manufactured by this company including aliphatic and aromatic chemicals, cellulose products and inorganic chemicals; two page chart appears listing those fields in which each of these chemicals find use. The Tennessee Eastman Co.

Acrylonitrile

*96-p. hard-bound technical book entitled, "Chemistry of Acrylonitrile" discussing the synthesis, physical and chemical properties of acrylonitrile along with a summary on its present and potential applications—including its uses in Buna-N synthetic rubber, in the production of certain synthetic fibers, and in the plastic field. Industrial Chemicals Div., Amercan Cyanamid Co., 30 Rockefeller Plaza, New York 20, N.Y.

*Chlorinated Paraffin Resin

8-p. technical bulletin entitled, "Chlorowax 70 in Alkyd Enamel Systems" describing the use of Chlorowax 70, a chemically inert, non-toxic resin, as a paint intermediate, and outlining a number of typical systems for formulating air-dried and force-dried paint or enamel and for incorporating the material as a portion of the grinding base. Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.

Surface Coatings

28-p. booklet on surface coatings based on vinylite resins discusses the essential applications of these coatings, the variety of surfaces which can be coated, and the various techniques of application used such as spraying, brushing, roller and knife coating, etc. Bakelite Co.

Silica Aerogel

16-p. booklet explaining the applications of Santocel C, a microscopically-divided silica aerogel, as a flatting agent for lacquers, flat and semi-gloss varnishes, baking enamels and vinyl films. Merrimac Div., Monsanto Chemical Co.

Equipment

Aluminum

*194-p. publication entitled, "The Aluminum Data Book" presents essential facts on aluminum alloys and mill products. In addition to 33 pages of explanatory text on such subjects as alloy designation system, temper designation system, casting alloys, wrought aluminum mill products, etc., the handbook contains 117 tables of data on physical, chemical, and mechanical properties, weights, fabricating details and many other factors. Reynolds Metals Co., 2500 So. Third St., Louisville, Ky.

* Request must be made to company on business letterhead.

Speed Recorders

20-p. revised catalog discussing and comparing the principles of operation of Micromax and Speedomax instruments, pointing out the special advantages of Speedomax where unusual requirements must be met; also described is the firm's line of tachometers for use with both the Micromax and Speedomax. Leeds & Northrup Co.

Rubber and Plastic Calendars

32-p. illustrated booklet on firm's line of calendars for processing rubber and plastics, furnishing general specifications, recent design improvements, parts lists and drawings, along with a diagram of roll arrangements used in various kinds of production. Farrel-Birmingham Co., Inc.

Manometer

4-p. bulletin describing and diagraming the "Zimmerli" gauge, a patented manometer for precise vacuum or differential pressure readings which now features two side outlets instead of one. Scientific Glass Co.

Steam Traps

Bulletin describing new type steam trap which combines seven different devices in one small, compact unit weighing about 8 lbs. and which has the capacity of 2" traps weighing up to 200 lbs. Velan Engineering Co.

Materials Handling

Catalog on complete line of company's handling equipment including hand trucks, platform trucks, barrel trucks, skids, dollies, and their line of semi-steel and rubber-tired wheels. Modern Equipment Co., Inc.

Cooling Towers

4-p. bulletin giving technical data on cooling towers, with packing bed of corrosion-resistant ceramic saddles which provide greatly increased surface area in relation to total volume. Aqua-Therm, Inc.

Piloted Type Couplings

Folder giving construction, application and selection information on piloted couplings that carry the weight of extended shafts with no intermediate support. The Falk Corp.

Diesel Engines

Illustrated folder explaining construction details of four cycle, one cylinder and two-cylinder, vertical mechanical injection, type 4FS Diesel engine designed for all small power applications. Nordberg Mfg. Co.

Micro-Bellows Pump

12-p. booklet discussing construction features, principles of operation, and applications of this industrial metering device; exploded views and diagrams are made use of to point out fact that all parts are interchangeable. Research Appliance Co.

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BUSINESS STAFF

SALES MANAGER ..... By Sawyer

BUSINESS MANAGER ..... Albert E. Weis

Atlanta .....Ralph C. Maultsby, 1311 Rhodes-Haverty Bldg., Atlanta 3, Ga.

Chicago .....Alfred D. Becker, Jr., Frank C. Mahnke, Jr., 520 N. Michigan Ave., Chicago 11, Ill.

Cleveland .....Vaughan K. Dissette, 1510 Hanna Bldg., Cleveland 15, Ohio

Dallas .....Jos. H. Allen, First Natl. Bank Bldg., Dallas 1, Texas

Los Angeles .....Carl W. Dysinger, H. L. Keeler, 1111 Wilshire Blvd., Los Angeles 17, Cal.

New York .....Knox Armstrong, Robert S. Muller, Charles L. Todaro, 330 West 42 St., New York 18, N. Y.

Philadelphia .....William B. Hannum, Jr., Architects Bldg., 17th & Sansom Sts., Philadelphia 3, Pa.

San Francisco .....Ralph E. Dorland, John W. Otterson, 68 Post St., San Francisco 4, Calif.

Boston ....1427 Statler Bldg., Boston 16

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Pittsburgh 738 Oliver Bldg., Pittsburgh 22

St. Louis ..3615 Olive St., Continental Bldg., St. Louis 8

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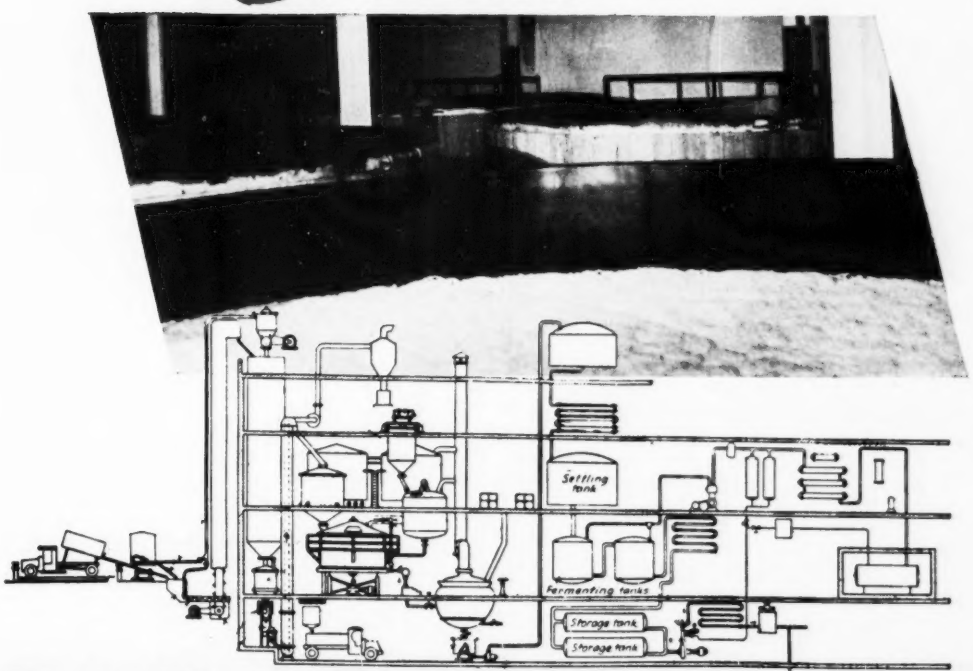

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